Catalog No. 7

PACIFIC TANK CO.

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CATALOG NO. 7

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Pacific Tank Co.

W. F. HAMPTON, President and General Manager
H. P. SACKETT, Vice-President and Assistant Manager
H. F. DIERKER, Vice-President and Assistant Manager
F. M. KIRSCH, - - - Secretary-Treasurer
F. C. PITCHER, Manager Manufacturing Department

Manufacturers of Complete

Cyanide Plants Tanks, Mining and Mill Supplies

FACTORIES:

San Francisco, Cal. Los Angeles, Cal. Olympia, Washington

OFFICES:

318 Market Street, - San Francisco, Cal.
Equitable Bank Bldg., Los Angeles, Cal.
2nd and Jefferson Sts., Olympia, Wash.
Dooly Block, - - Salt Lake City, Utah

CABLE ADDRESS:

TANKAGE, San Francisco, California
TANKAGE, Los Angeles, California
TANKAGE, Olympia, Washington
TANKAGE, Salt Lake City, Utah

CODES USED:

Western Union Telegraphic Code, (Universal Edition)
A. B. C. - - - - - - (Fifth Edition)
Bedford McNeil - - - - - Mining and General)
Lieber's Standard Telegraph Code
Pacific Tank Company's Private Code Use when possible)

Catalog No. 7

This Mining Catalog and Price List supersedes all previous issues.

Terms

All sales are made for cash, one-third cash with order, balance when goods are ready to ship, unless special terms are agreed upon.

Orders for export must be accompanied by remittance and arrangements made to pay balance against bill of lading through some responsible banking house in New York, San Francisco, Los Angeles or Olympia.

No allowances will be made for unauthorized labor or repairs.

All claims for corrections or allowances must be made within fifteen (15) days from receipt of goods.

Contracts are subject to strikes, accidents or other causes beyond our control.

Our responsibility ends when goods are delivered in good condition to the transportation company, and any claims for loss of or damage to goods while in transit must be made to them direct.

All quotations are f. o. b. cars at the factory making the shipment, unless otherwise specified, and are subject to change without notice.

Packing. Special packing for export or for mule-back transportation will be charged for extra at actual cost of labor and material.

Services of an expert will be furnished to erect cyanide plants or tanks under special agreement.

In making inquiries when referring to pages in this catalog, be sure and state **CATALOG NO. 7**, as the illustrations and prices on these pages do not correspond with former editions.

Tanks furnished from our Puget Sound Factory are manufactured from Washington Fir. Our San Francisco and Los Angeles Factories make a specialty of Redwood Tanks, but are prepared to furnish Fir Tanks when requested.

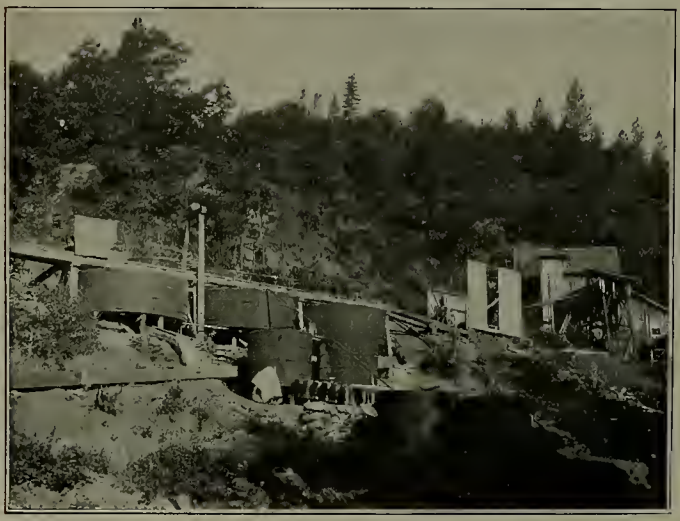
141053

[illegible] Ore Plants should give us as much of [illegible]. Answer all questions fully that apply to your [illegible] Coast [illegible] carefully number

Necessary Information Required

1. Nearest shipping point
2. Daily capacity desired tons.
3. Do you crush dry or wet?
4. Have you had a cyanide test made?
5. How many hours contact does the ore require to get the best extraction?
6. What kind of ore have you?
7. How much elevation is available for the plant?
8. Have you water available for sluicing?
9. Or must the tailings be shoveled?
10. Is the location of site rocky or easily excavated?
11. If water is available, shall we provide a suitable pump for sluicing?
12. What kind of power have you?
13. Do you prefer any particular style of filter-bottom?
14. If ore is wet crushed, what percentage of slimes do you get?
15. What percentage of slime can be leached with sands?
16. If you receive your slime in a wet condition, what will be the ratio of solution to slime?
17. To what per cent of moisture can you settle your slime?
18. Does the slime carry any value?
19. If so, how much?
20. Do you desire to treat the slime in a separate plant?
21. What process do you prefer, filter press, decantation or patent filter process?
22. How many hours does it require for the slime to settle?
23. How long must the slime be agitated?
24. What is your preference in solution pumps? Centrifugal, rotary or steam?
25. Shall we furnish the pipe-fitting tools for putting in the plant?
26. Do you wish a lathe to cut your zinc shavings, or will you buy them already cut?
27. Shall we furnish classifiers for separating sands and slime?
28. Shall we include in this estimate clean-up apparatus?
29. Shall we include refining apparatus?
30. Do the goods require any special packing as for mule-back transportation?

Pumping Plant of Olympia (Wash.) Water Works—Showing large oil storage tank in foreground



Two Views of Marina Marsicano Gold Mining Co. Mill and Cyanide Plant,
Sunny Hill, Shasta County, California

Solution Tanks

In general practice there are usually two of these tanks in operation, one for the storage of weak solution and one for the strong solution.

Thirty-two cubic feet of water or solution equal one ton of 2,000 pounds (approximate).

For list prices and shipping weights, see pages 6-7.

TESTIMONIAL

Torres, Sonora, Mexico, June 18, 1907.

Pacific Tank Company,
San Francisco, Cal.

Gentlemen: In response to your favor of the 14th inst., we beg to state that the tanks ordered of you for our Cyanide Plant were received in good condition and we experienced no trouble in erecting them. Same have been in use now for three years and have proven entirely satisfactory.

Yours very truly,
The Creston Colorado Company,
By J. V. Bacon.

Solution Tanks

Two-inch Lumber

Fitted with Round Soft Steel Hoops and Straight Pull Malleable Iron Lugs

Capacity Tons of Solution	Outside Diameter Feet	Outside Height Feet	Thickness of Lumber	Approximate Shipping Weight	List Price	Code Name
2	5	4	2″	448 lbs.	$ 26.00	Habeto
2½	5	5	2″	531 "	31.00	Habotr
3	6	4	2″	558 "	32.00	Hablte
4	6	5	2″	657 "	37.00	Haclio
4½	7	5	2″	791 "	44.00	Haelto
5	6	6	2″	757 "	43.00	Hacetr
5½	7	6	2″	905 "	51.00	Haicto
7	8	5	2″	933 "	52.00	Hacote
8½	8	6	2″	1065 "	59.00	Hacltr
9	9	5	2″	1051 "	58.00	Hadelo
10½	9	6	2″	1199 "	65.00	Hadile
12½	9	7	2″	1346 "	73.00	Hadolr
11	10	5	2″	1201 "	66.00	Hagarl
13½	10	6	2″	1365 "	74.00	Hagalo
16	10	7	2″	1528 "	83.00	Hagele
18½	10	8	2″	1692 "	92.00	Hagelf
19	12	6	2″	1731 "	94.00	Hagelp
22	12	7	2″	1928 "	105.00	Hailzo
26	12	8	2″	2126 "	115.00	Hallon
33	12	10	2″	2520 "	137.00	Haltie
31	14	7	2″	2358 "	129.00	Hamlon
36	14	8	2″	2589 "	141.00	Hamsor
45	14	10	2″	3068 "	168.00	Hamste
35½	15	7	2″	2562 "	139.00	Hanato
41	15	8	2″	2807 "	153.00	Hanelb
52	15	10	2″	3335 "	182.00	Handil
63	15	12	2″	3825 "	209.00	Handlo
40	16	7	2″	2788 "	151.00	Handob
46	16	8	2″	3049 "	165.00	Hangit
58	16	10	2″	3613 "	197.00	Hangle
69	16	12	2″	4135 "	225.00	Hangmo
52	18	7	2″	3260 "	175.00	Haplel
60	18	8	2″	3553 "	191.00	Haplon
76	18	10	2″	4181 "	226.00	Harano
92	18	12	2″	4809 "	261.00	Harral

For Solution Tanks made of 3″ lumber, see page 7.

All list prices in this catalog are subject to discount.

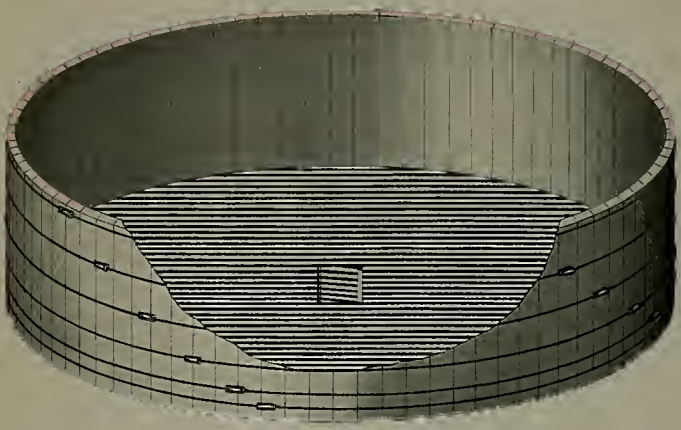
Solution Tanks

Three-inch Lumber
Fitted with Round Soft Steel Hoops and Straight Pull Malleable Iron Lugs

Capacity Tons of Solution	Outside Diameter Feet	Outside Height Feet	Thickness of Lumber	Approximate Shipping Weight	List Price	Code Name
35½	15	7	3″	4546 lbs.	$197.00	Harell
41	15	8	3″	4973 "	216.00	Harfan
52	15	10	3″	5865 "	257.00	Harett
63	15	12	3″	6719 "	294.00	Harmel
40	16	7	3″	4954 "	214.00	Harpen
46	16	8	3″	5409 "	234.00	Harpol
58	16	10	3″	6361 "	277.00	Harpat
69	16	12	3″	7272 "	318.00	Harpse
52	18	7	3″	5814 "	250.00	Hastle
60	18	8	3″	6325 "	273.00	Haslot
76	18	10	3″	7390 "	321.00	Hasmor
91	18	12	3″	8456 "	369.00	Hatemo
63	20	7	3″	6926 "	303.00	Hatile
73	20	8	3″	7518 "	329.00	Hatome
82½	20	9	3″	8112 "	356.00	Haught
92	20	10	3″	8704 "	383.00	Haugle
112	20	12	3″	9891 "	436.00	Hauhen
132	20	14	3″	11078 "	489.00	Hauham
76½	22	7	3″	7925 "	345.00	Haubob
88½	22	8	3″	8577 "	374.00	Havert
100	22	9	3″	9232 "	404.00	Havorn
112	22	10	3″	9885 "	433.00	Havler
136	22	12	3″	11192 "	492.00	Havlom
160	22	14	3″	12740 "	568.00	Hawkes
105	24	8	3″	9681 "	422.00	Hawkom
119	24	9	3″	10395 "	455.00	Hawkel
133	24	10	3″	11107 "	487.00	Hawkla
162	24	12	3″	12662 "	562.00	Hawtho
191	24	14	3″	14365 "	647.00	Haylot
219	24	16	3″	16158 "	738.00	Haylen
123	26	8	3″	10848 "	472.00	Haylel
157	26	10	3″	12384 "	543.00	Haymon
191	26	12	3″	14118 "	626.00	Haynot
224	26	14	3″	16039 "	723.00	Haydet
257	26	16	3″	17961 "	820.00	Haybel

For Solution Tanks manufactured of 2″ lumber, see page 6.

Leaching Tanks



These tanks are made with vertical sides to allow the saturated ore to settle uniformly, instead of settling away from the sides, which could not be avoided in tapering tanks.

The general demand is for shallow leaching tanks with from three feet to eight feet inside depth and proportionately larger diameter, because the leaching capacity increases as per area of tank bottom.

The average ore, after crushing, requires 25 cubic feet space to the ton and capacities of leaching tanks are figured accordingly.

TESTIMONIAL

July 12, 1907.

Pacific Tank Company,
San Francisco, Cal.

Gentlemen: Your letter of June 14th to the Montana-Tonopah Mining Company has been referred to me. In reply will state that the Company's recent order for tanks and filter boxes for their 200-ton plant at Tonopah arrived there in good shape, and that the tanks, now set up, are perfectly satisfactory.

Very truly yours,
F. L. Bosqui.

Leaching Tanks

[illegible] Diameter Inside	Outside Depth	Depth of Staves	Number of Hoops	Approximate Shipping Weight	List Price	Code Name
5	8	1	2"	802 lbs.	$ 45.00	Hazaro
10	11	1	2"	1189 "	65.00	Hazelt
10	9	5	2"	1051 "	58.00	Hazome
15	13	1	2"	1493 "	80.00	Hazolr
15	11	5	2"	1369 "	75.00	Hazben
20	15	4	2"	1819 "	97.00	Haxeno
20	13	5	2"	1706 "	92.00	Haxoto
25	17	4	2"	2189 "	117.00	Haxbon
25	11	5	2"	1982 "	107.00	Haxter
30	18	4	2"	2381 "	127.00	Ieonic
30	15	5	2"	2062 "	110.00	Ieonod
10	21	4	2"	3116 "	170.00	Idcalc
10	18	5	2"	2674 "	143.00	Idetal
50	23	4	2"	3599 "	194.00	Ideten
50	20	5	2"	3262 "	176.00	Idiloe
60	25½	4	2"	1216 "	226.00	Idiotf
60	22	5	2"	3752 "	202.00	Idleno
20	15	1	3"	3257 "	140.00	Idlemi
20	13	5	3"	3036 "	131.00	Idlett
25	17	4	3"	3925 "	168.00	Idlern
25	14½	5	3"	3531 "	153.00	Idlama
30	18	4	3"	1278 "	183.00	Idoliz
30	15	5	3"	3682 "	159.00	Idylet
40	21	4	3"	5558 "	241.00	Ignita
40	18	5	3"	4791 "	206.00	Ignote
50	23	4	3"	6385 "	276.00	Ignora
50	20	5	3"	5740 "	250.00	Ignoci
60	25½	4	3"	7505 "	324.00	Imager
60	22	5	3"	6618 "	287.00	Imaget
75	24	5	3"	7560 "	329.00	Imbecd
75	22	6	3"	7270 "	317.00	Imbido
80	25	5	3"	8023 "	347.00	Imbret
80	23	6	3"	7744 "	337.00	Imitab
100	33	4	3"	11385 "	487.00	Imitel
100	29	5	3"	10078 "	435.00	Impael
100	26	6	3"	9293 "	404.00	Impait
200	40	5	3"	16877 "	721.00	Impail
200	36	6	3"	15318 "	662.00	Impasf
500	57	6	3"	32694 "	1398.00	Impihs
500	52	7	3"	29848 "	1297.00	Imphoe
500	48	8	3"	27883 "	1223.00	Imphet

The above prices do not include False Bottoms, Filter Cloths or Bottom Discharge Doors, as these items vary according to specifications.

All list prices in this catalog are subject to discount.

Gold Storage Tanks

These tanks are of special benefit in connection with cyanide plants where the solution, as it comes from the leaching tanks, is not clear, showing that such solution holds vegetable matter and fine slime in suspension; in order to allow them to settle, the inlet pipe discharges near the bottom of the tank and the clear solution is drawn off at the top by means of a floating hose.

TESTIMONIAL

Olympia, Wash., Aug. 7, 1905.

Pacific Tank Co.,
Olympia, Wash.,

Gentlemen: We have in use three or four fir tanks. They have been in position from two to ten years. In size they are from 10,000 to 25,000 gallons. They are perfectly tight, are not checked, and show no signs of wear in any way. If we put in any new tanks they will be of fir. Of course the order would be given to a firm like yours who understand manufacturing tanks.

Yours very truly,
Olympia Lumber Co.,
(Signed) C. S. Eaton, Sec. Treas.

Gold Storage Tanks

Including Hose, Float and Tank Connection

Capacity Tons of Solution	Outside Diameter Feet	Outside Height Feet	Thickness of Lumber	Approximate Shipping Weight	List Price	Code Name
2	5	4	2″	418 lbs.	$ 36.00	Jabber
2½	5	5	2″	531 "	42.00	Jabirn
3	6	6	2″	737 "	56.00	Jacama
3½	6	7	2″	856 "	63.00	Jachus
4½	6	8	2″	956 "	70.00	Jacone
5½	8	6	2″	1065 "	72.00	Jacent
6½	8	7	2″	1196 "	80.00	Jachet
7½	8	8	2″	1328 "	89.00	Jackad
13	9	7	2″	1346 "	88.00	Jacker
15	9	8	2″	1193 "	98.00	Jackda
17	9	9	2″	1641 "	107.00	Jackfr
16	10	7	2″	1528 "	98.00	Jackni
18½	10	8	2″	1692 "	108.00	Jackpl
21	10	9	2″	1855 "	118.00	Jacobn
22½	10	10	2″	2019 "	129.00	Jacone
29	10	12	2″	2345 "	150.00	Jacqua
22½	12	7	2″	1928 "	119.00	Jactan
26	12	8	2″	2126 "	131.00	Jacula
29	12	9	2″	2323 "	144.00	Jagged
33	12	10	2″	2520 "	156.00	Jagger
10	12	12	2″	2914 "	181.00	Jagghe
35	14	8	2″	2589 "	157.00	Jaggin
40	14	9	2″	2820 "	171.00	Jamdar
45	14	10	2″	3068 "	187.00	Jamaso
55	14	12	3″	6205 "	295.00	Janeof
45	16	8	3″	5451 "	254.00	Jangad
51	16	9	3″	5907 "	275.00	Jangle
58	16	10	3″	6361 "	297.00	Janito
69	16	12	3″	7272 "	340.00	Janiza
60	18	8	3″	6367 "	292.00	Janshn
68	18	9	3″	6880 "	316.00	Jantil
76	18	10	3″	7390 "	341.00	Jantuo
92	18	12	3″	8456 "	392.00	Jantye

All mining tanks are fitted with round soft steel hoops and straight pull malleable iron lugs, unless otherwise specified.

Refer to page 107 for useful information.

Three Views of Eagle Mining and Improvement Company's Plant, Parsons, New Mexico,
Showing Plant under Construction and Operation
Manufactured by Pacific Tank Company

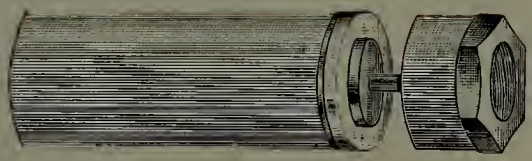
Vacuum Tanks

The time required for leaching is one of the principal factors in determining the cost of cyaniding, and to reduce this time to a minimum is the endeavor of all operators.

It is a well-known fact that by creating a vacuum below the filter, leaching is very much facilitated, and for this reason we have furnished a great many Cyanide Plants fitted with Vacuum Tanks and Vacuum Pump.

The simplest arrangement to obtain the required results is by fitting the Gold Storage Tank with a drum head which makes the tank air-tight; then a pipe connection is made from the top of this tank to a Vacuum Pump. See page 14.

Automatic Shut-off



Price, each $2.00

Code Name—JANUAR

The head of the tank is provided with a suitable man-hole, and to prevent the solution from being drawn into the Vacuum Pump, an Automatic Shut-off Valve is attached to the air pipe. If desired, a glass gauge may be placed on the side of the tank to show when the tank is nearly full of solution.

All list prices in this catalog are subject to discount.

Vacuum Settling Tanks

Including Solution Gauge, Automatic Shut-off, Tank Connections, Hose and Float

Fitted with round hoops as shown in cut

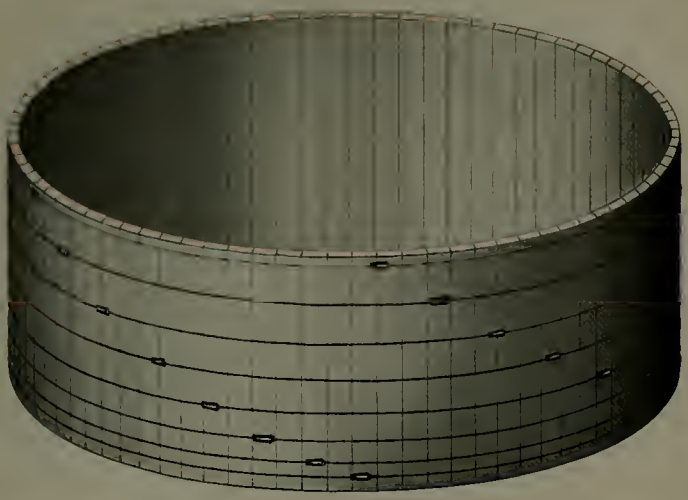
Capacity Tons of Solution	Outside Diameter Feet	Outside Height Feet	Thickness of Lumber	Approximate Shipping Weight	List Price	Code Name
5	6	6	3″	1594 lbs.	$ 90.00	Japena
10	8	8	3″	2816 "	146.00	Japeti
15	9	8	3″	3179 "	161.00	Jarara
20	10	9	3″	3947 "	195.00	Jarbel
25	12	8	3″	4729 "	227.00	Jardes
30	12	10	3″	5417 "	261.00	Jargle
43	14	10	3″	6722 "	318.00	Jargog
50	14	12	3″	7527 "	357.00	Jarnut
65	18	9	3″	9067 "	414.00	Jashaw
75	18	10	3″	9578 "	438.00	Jasmin
100	20	12	3″	12591 "	577.00	Jaspac

The above prices do not include inside head supports, as there is usually enough rough lumber at the mine with which to supply these.

Tanks furnished from our Puget Sound Factory are manufactured from Washington Fir. Our San Francisco and Los Angeles Factories make a specialty of Redwood Tanks, but are prepared to furnish Fir Tanks when requested.

Sump Tanks

Fitted with Round Soft Steel Hoops and Straight Pull Malleable Iron Lugs



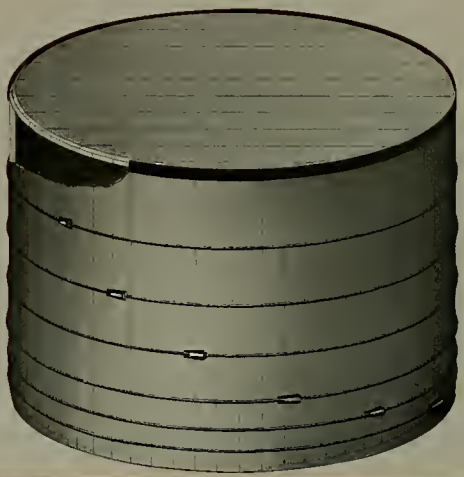
Capacity Tons of Solution	Outside Diameter Feet	Outside Height Feet	Thickness of Lumber	Approximate Shipping Weight	List Price	Code Name
3	6	4	2"	558 lbs.	$ 32.00	Jaspon
4	7	4	2"	676 "	38.00	Jatrop
5	8	4	2"	802 "	45.00	Jaundi
6½	9	4	2"	904 "	50.00	Jaunte
10	10	5	2"	1201 "	65.00	Javane
11	10	6	2"	1365 "	74.00	Javeln
12½	11	5	2"	1369 "	75.00	Javlin
15	11	6	2"	1551 "	85.00	Jawful
15	12	5	2"	1534 "	83.00	Jawtop
19	12	6	2"	1731 "	94.00	Jawoed
18	13	5	2"	1706 "	92.00	Jazera
22	13	6	2"	1919 "	104.00	Jealou
21	14	5	2"	1896 "	103.00	Jejune
26	14	6	2"	2127 "	115.00	Jentli
24½	15	5	2"	2072 "	112.00	Jeofai
34	16	6	2"	2517 "	136.00	Jeopar
43	18	6	3"	5301 "	228.00	Jerboa
53	20	6	3"	6332 "	276.00	Jerful
77	24	6	3"	8275 "	361.00	Jerkin
88	26	6	3"	9293 "	404.00	Jervin
110	30	6	3"	11511 "	498.00	Jester

For other sizes see Solution or Leaching Tanks listed on pages 6, 7, 9.

Refer to page 107 for useful information.

Chlorination Tanks

With Projecting Top Hoop and Double T. & G. Cover



Capacity Tons of Ore	Outside Diameter Feet	Outside Height Feet	Thickness of Lumber	Approximate Shipping Weight	List Price	Code Name
4	6	4	2″	780 lbs.	$ 45.00	Jestfu
9	8	5	2″	1303 "	72.00	Jetbla
13	9	6	2″	1654 "	91.00	Jetdea
17	10	6	2″	1919 "	105.00	Jeteru
25	12	6	2″	2508 "	136.00	Jetpum

Rectangular Settling Tanks

Code Name—JETSAM

We construct this class of tanks with or without partitions, or we can furnish them complete with Oregon Pine Foundation Timbers and side supports.

On account of the unlimited variety in size and construction, we prefer to quote prices upon receipt of data giving length, width and depth desired.

Rectangular tanks are always figured outside measurements unless otherwise specified.

DIRECTIONS FOR ERECTING FALSE BOTTOMS

Style "B"

[illegible] lay on the 1¼"x 1¼" crozed strips 2 it centers, [illegible] at right angles to the bottom boards, then on top of the 1¼"x 1¼" [illegible] x" strips at right angles to the 1¼"x 1¼" crozed strips, placing [illegible] at. The Leaching Tanks being outside measure, you [illegible] the thickness of staves, the 2" or 3" that you have opened the tank [illegible] for caulking purpose, and the "x 1¼" binding strip, that is placed around [illegible] interference of the false bottom to protect the filter cloths. After the ⅞" [illegible] crozed strips are nailed together, it is a good plan to cut the crozed strips so that the false bottom will be in sections of a width that can be easily handled, if you [illegible] to lift the false bottom up at any future time.

Now in the center of the tank, using a small strip 1"x 2", making this length the [illegible] of the false bottom and driving a nail through each end, the one at the center to hold it in place, and the other to scratch a mark, you will quickly make the desired circle, so that the ends of the false bottom strips can be cut off. After this is done, nail the ⅜"x 1¼" finishing strip around the entire circumference of the false bottom you have just cut to circle.

It will be found advantageous to construct other styles in a similar manner before the staves of the tank are set in position, and we recommend that before the staves are set up, the false bottom be built on top of the tank bottom proper.

DIRECTIONS FOR ATTACHING DISCHARGE DOORS TO BOTTOM

I. Cut a hole in the bottom of the tank equal to the outside measure of the iron door casting.

II. Place the iron frame in place and lay off the bolt holes.

III. Remove the iron frame, bore the holes of exactly the same size as the bolts which are intended for the same. Give the tank bottom a thick coat of paint under the flange of the door frame and bolt the door in place before the paint dries.

IV. To close the door, fasten cross bar in place by use of bolt, and apply the pressure by means of hand wheel.

A little consideration will show at once how the door will swing.

All bolts passing through the tank bottom should be a driving fit, and instead of forcing the bolts through with a hammer, which may cause slivering of the tank bottom, a wrench should be used to screw the bolts to place, which can be done without difficulty.

DIRECTIONS FOR ATTACHING SIDE DISCHARGE DOORS

The inside flange of these doors should be placed at least one (1) full inch above the bottom of the tank. This flange resting on the end of staves that are cut off, allows the flange to pass through the staves.

These four (4) or five (5) short pieces of stave will then have the regular chime below the tank bottom and approximately one (1) full inch above the croze.

The two (2) bottom bolts can be dispensed with, as it will not be necessary to use them on account of the other bolts and hoops holding the door in place.

When the door is set according to these directions, the bottom part of the opening in the door will be from 1" to 1½" below the top of the false bottom, thus giving quick and easy delivery of the sludge.

It is always advisable to use burlap gaskets saturated with acid-proof paint around the rim of the casting, between it and the staves.

It is necessary that the bottom hoop go on top of the lower flange of the door and also opposite the croze in the staves, so as to bring proper tension on the staves against the bottom of the tank. In this way it will make everything tight and satisfactory.

False Bottoms

Style "A"

For Leaching Tanks

Weight, 3 pounds per square foot

This bottom consists of a grating manufactured from Oregon Pine, strips laid about 1¼" apart, and for the protection of the filter cloth a thin band is placed around the outer edge of these strips.

Each strip is crozed to allow free flow of solution on bottom of Leaching Tank.

TESTIMONIAL

Ocampo, Chih., Mexico, June 26, 1907.

The Pacific Tank Company,
San Francisco, Cal., U. S. A.

Gentlemen: Replying to your favor of June 14, 1907, we have great pleasure indeed in congratulating you on the manner in which our order of April 10, 1905, was filled. All material arrived in first-class condition and fit so exactly that we had no trouble whatever in erection. Tanks then supplied have been in constant use and are today in perfect condition.

When we decided to extend our plant during the present year, we had no hesitation in placing order for our requirements with your house. This second shipment is now at our nearest railway point, and reported in excellent condition.

Sincerely yours,
The Waterson Gold Mining Co., Ltd.,
Wm. Thompson, General Manager.

False Bottoms

Style "A"

Diameter of Bottom, Feet	Shipping Weight	List Price	Code Name
3	22 lbs.	$ .80	Jetton
3½	29 "	1.00	Jibber
4	38 "	1.30	Jibdor
4½	48 "	1.60	Jiboya
5	59 "	2.00	Jickaj
5½	71 "	2.30	Jiggis
6	85 "	2.70	Jigjog
6½	100 "	3.15	Jimmer
7	115 "	3.60	Jimson
7½	133 "	4.10	Jingal
8	151 "	4.60	Jobati
8½	170 "	5.20	Jobste
9	191 "	5.80	Jocant
9½	213 "	6.40	Jocose
10	236 "	7.10	Jocula
10½	260 "	7.75	Jocund
11	285 "	8.50	Jogger
11½	312 "	9.20	Joggle
12	339 "	10.00	Joghis
12½	368 "	10.80	Johaul
13	398 "	11.70	Joindr
13½	429 "	12.60	Jointe
14	462 "	13.50	Jollif
14½	495 "	14.40	Jollye
15	530 "	15.40	Jolter
16	603 "	17.40	Jonath
18	763 "	22.00	Jongle
20	942 "	27.00	Jonqui
22	1140 "	32.50	Jocram
24	1357 "	38.50	Josole
25	1473 "	41.70	Jostic
26	1593 "	45.00	Jounce
28	1847 "	52.00	Journa
30	2121 "	59.60	Jovial
32	2413 "	67.70	Jowler
34	2724 "	76.30	Joyane
36	3054 "	85.40	Joyflu
40	3770 "	105.10	Jubile
42	4156 "	115.75	Jucand
44	4562 "	126.90	Judger
48	5429 "	130.75	Judica
50	5891 "	163.40	Jugger

Prices F. O. B. Factory

These bottoms are furnished in strips suitable to make a complete grating across the entire bottom of the tank.

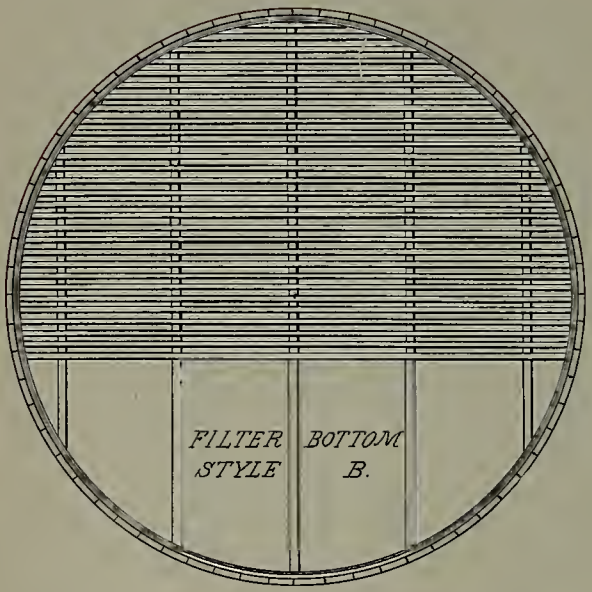
For intermediate sizes, take next higher list.

All list prices in this catalog are subject to discount.

False Bottoms

Style "B"

For Leaching Tanks



Weight, 2½ pounds per square foot

The bottom strips of this filter bottom are similar to Style "A" (but placed about 2 ft. apart), on which a grating is laid, consisting of ⅞"x ⅞" Oregon Pine strips spaced 1" apart, with a suitable strip around the outer edge of ⅞" strips to prevent filter cloth from being cut.

False Bottoms

Style "B"

Diameter of Bottom, Feet	Shipping Weight	List Price	Code Name
3	18 lbs.	$ .65	Juglet
3½	24 "	.80	Juglar
4	31 "	1.00	Juicen
4½	40 "	1.20	Juisel
5	49 "	1.45	Jumper
5½	59 "	1.75	Juncac
6	71 "	2.00	Juncet
6½	83 "	2.35	Junson
7	96 "	2.70	Jungle
7½	110 "	3.05	Junior
8	126 "	3.40	Junipe
8½	142 "	3.85	Junket
9	159 "	4.30	Juncel
9½	177 "	4.70	Juntar
10	196 "	5.20	Juntol
10½	216 "	5.70	Jupite
11	238 "	6.25	Jupona
11½	260 "	6.80	Jurali
12	283 "	7.35	Jurase
12½	307 "	7.95	Juratn
13	332 "	8.55	Juride
13½	358 "	9.20	Justal
14	385 "	9.85	Justic
14½	413 "	10.55	Jushel
15	442 "	11.20	Justem
16	503 "	12.70	Justif
18	636 "	15.95	Justle
20	785 "	19.55	Juttin
22	950 "	23.50	Jutear
24	1131 "	27.80	Jutlan
25	1227 "	30.15	Jutwin
26	1327 "	32.50	Juvena
28	1539 "	37.60	Juveat
30	1767 "	43.00	Juxtap
32	2011 "	48.80	Juxail
34	2270 "	54.95	Juxpan
36	2544 "	61.50	Juxnel
40	3142 "	75.60	Juxyno
42	3464 "	83.25	Jymano
44	3801 "	91.20	Jynomf
48	4524 "	108.25	Jypent
50	4909 "	117.40	Jypate

Prices F. O. B. Factory

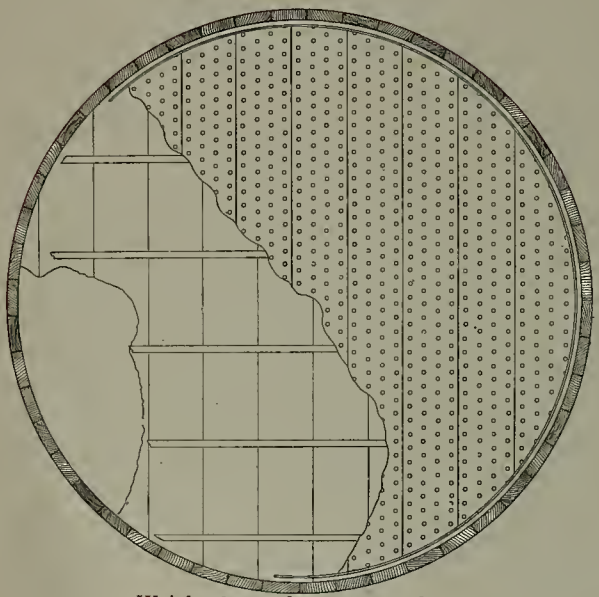
These bottoms are furnished in strips of suitable lengths to make a complete grating across the entire bottom of the tank.

Intermediate sizes not specified take next higher list.

False Bottoms

Style "C"

For Leaching Tanks



Weight, 3 pounds per square foot

This filter bottom is constructed of a 1-inch Oregon Pine floor, provided with 5/8" holes approximately 2" apart, and is supported by crozed strips as shown in cut above.

TESTIMONIAL

Mazatlan, July 1, 1907.

Pacific Tank Company,
San Francisco, Cal.

Gentlemen: We take pleasure in certifying that 8 Redwood Leaching Tanks, 31'x 8'x 3", 6 Redwood Leaching Tanks, 31'x 10'x 3"; all Iron Bottom Discharge Doors, purchased of you six years ago for our Cyanide Plant, have given entire satisfaction.

The material for the above tanks was received in good condition and properly packed, and the tanks erected by one of your experienced tank-men, who did his work satisfactorily.

Yours very truly,
Negociacion Minera de Guadalupe de los Reyes,
J. H. Rico, President.

False Bottoms

Style "C"

Diameter of Bottom Feet	Shipping Weight	List Price	Code Name
3	27 lbs.	$ 1.40	Kabasu
3½	33 "	1.65	Kadias
4	48 "	2.30	Kafaso
4½	60 "	2.85	Kaffre
5	75 "	3.55	Kafflo
5½	90 "	4.25	Kahavl
6	108 "	5.00	Kahebt
6½	126 "	5.85	Kakare
7	147 "	6.75	Kakoxi
7½	168 "	7.75	Kaleid
8	192 "	8.75	Kalenr
8½	195 "	9.00	Kalifo
9	219 "	10.05	Kaloye
9½	243 "	11.10	Kalsom
10	270 "	12.25	Kamach
10½	297 "	13.50	Kamsin
11	327 "	14.85	Kangar
11½	357 "	16.15	Kantry
12	390 "	17.60	Kaolin
12½	423 "	19.05	Karaga
13	456 "	20.50	Karask
13½	492 "	22.10	Karobl
14	528 "	23.70	Karpho
14½	567 "	25.40	Karsen
15	609 "	27.25	Katydi
16	690 "	30.80	Kavanl
18	876 "	39.00	Kavase
20	1080 "	47.90	Kayake
22	1308 "	57.90	Kaylet
24	1554 "	68.60	Kaynar
25	1686 "	74.40	Kazard
26	1824 "	80.40	Kecksy
28	2118 "	93.20	Kedget
30	2430 "	106.80	Kedlac
32	2766 "	121.50	Keiser
34	3120 "	136.90	Keilta
36	3498 "	153.30	Keirma
40	4320 "	189.00	Kelden
42	4764 "	208.60	Kelker
44	5226 "	228.45	Keltep
48	6222 "	271.70	Kemben
50	6750 "	294.65	Kemeli

Prices F. O. B. Factory

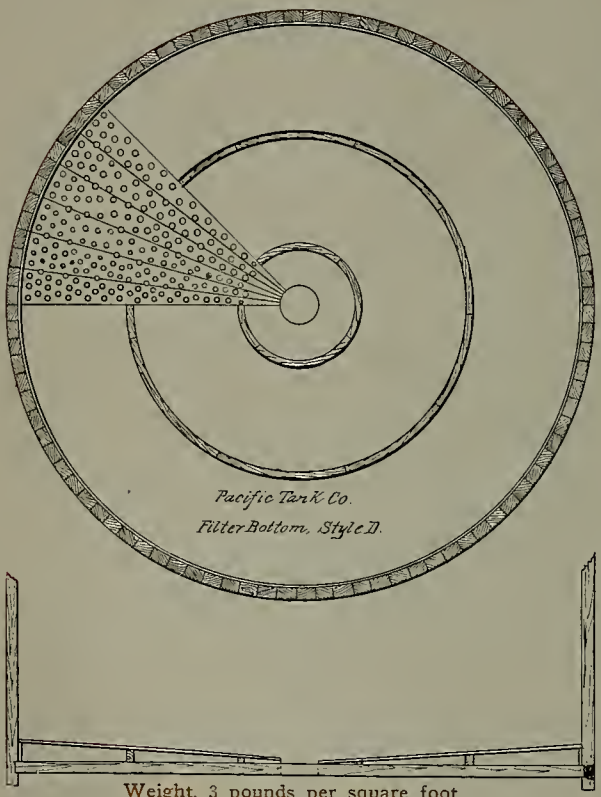
Intermediate sizes not specified above, take next higher list.

Refer to page 107 for useful information.

False Bottoms

Style "D"

For Leaching Tanks, Sloping 5° to Center



Weight, 3 pounds per square foot

This filter bottom consists of 1" Oregon Pine perforated with ½" holes, about 2" center to center.

The bottom rests upon circles 3' apart. The circles are built up to different heights with openings crozed in lower part for free flow of solution, except in large diameter tanks, when blocks or posts are used under circles.

Tailings discharge is placed in center of tanks, but bottoms for tanks above 36' diameter have special arrangement for 4 bottom discharge doors.

Tanks furnished from our Puget Sound Factory are manufactured from Washington Fir. Our San Francisco and Los Angeles Factories make a specialty of Redwood Tanks, but are prepared to furnish Fir Tanks when requested.

False Bottoms

Style "D"

Size	Shipping Weight	List Price	Code Name
10	198 lbs	$ 14.00	Kempty
11	246 "	17.00	Kennel
12	284 "	20.00	Kentbu
13	366 "	25.00	Kentis
14	432 "	29.00	Keramo
15	493 "	33.00	Kerana
16	549 "	37.00	Kerasi
17	628 "	42.00	Kerbst
18	758 "	51.00	Kerchi
19	848 "	56.00	Kernba
20	933 "	61.00	Kernel
21	1035 "	67.00	Kerodo
22	1117 "	72.00	Kersey
23	1281 "	83.00	Kervet
24	1381 "	89.00	Kesita
25	1480 "	95.00	Kestre
26	1602 "	103.00	Ketcha
27	1734 "	112.00	Keveli
28	1798 "	115.00	Keyage
29	2045 "	130.00	Keyton
30	2178 "	139.00	Khalif
31	2320 "	147.00	Khamsi
32	2438 "	156.00	Khenna
33	2705 "	171.00	Kibitk
34	2843 "	180.00	Kicksh
35	2979 "	191.00	Kidfox
36	3184 "	202.00	Kidnap

Prices F. O. B. Factory

Intermediate sizes not specified above, take next higher list.

TESTIMONIAL

Ono, Shasta County, Cal., June 18, 1907.

Pacific Tank Company,
San Francisco, Cal.

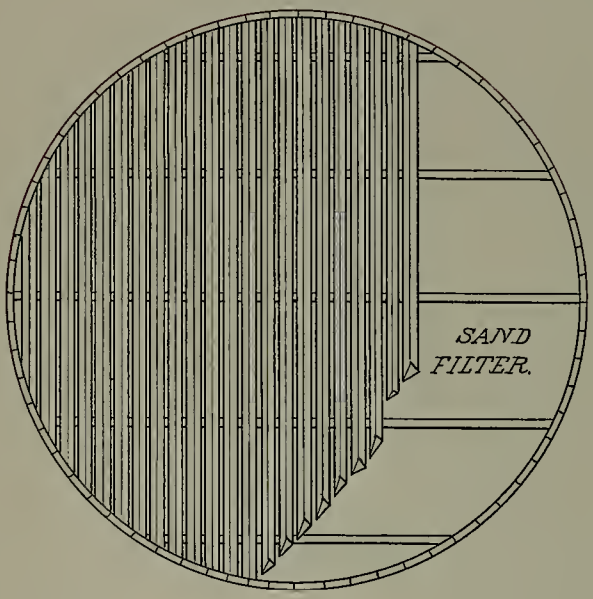
Gentlemen: In answer to your letter of June 15th, will say the 10-ton Cyanide Plant you furnished to our Company is satisfactory in every way. The goods arrived in first-class order, and everything was exactly as the specifications called for.

We are putting through 12 tons of tailings every 24 hours by percolation, and everything about the plant works to perfection. All the tanks are absolutely tight; there is no leakage whatever.

I remain, yours truly,
Marina Marsicano Gold Mining Company,
J. F. Barlow, Superintendent.

Sand Filter Bottoms

Style "E"



Weight, 4 pounds per square foot

In some localities this filter is very much used. It consists of triangular slats, approximately 3″x 3″x 3″, resting on regular crozed sill pieces.

The spaces between the slats are filled with gravel, sand or quartz, level with the upper edge, and filter cloths are not needed in connection with them.

This filter is highly recommended for copper leaching.

Sand Filter Bottoms

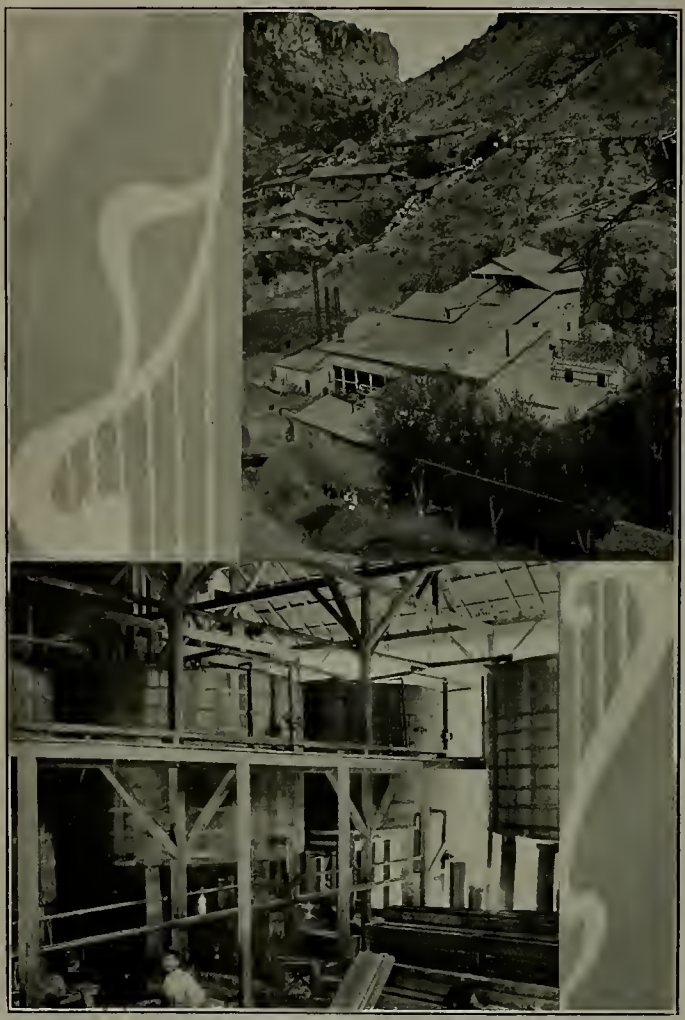
Style "E"

Diameter of Bottom, Feet	Shipping Weight	List Price	Code Name
6	93 lbs.	$ 2.70	Kilder
7	154 "	4.40	Kimbot
8	201 "	5.75	Kimate
9	254 "	7.25	Kindre
10	314 "	9.00	Kingom
11	380 "	10.85	Kingis
12	452 "	12.95	Kiniet
13	531 "	15.20	Kinnik
14	616 "	17.60	Kinone
15	707 "	20.20	Kipper
16	804 "	23.00	Kirket
17	908 "	25.90	Kitchn
18	1018 "	29.05	Kithar
19	1134 "	32.40	Klepht
20	1257 "	35.90	Klicke
21	1385 "	39.55	Klipda
22	1521 "	43.45	Knable
23	1662 "	47.45	Knackm
24	1810 "	51.70	Knaple
25	1963 "	56.10	Knarle
26	2124 "	60.65	Knaver
27	2291 "	65.45	Kneade
28	2463 "	70.35	Knebel
29	2642 "	75.50	Knitch
30	2827 "	80.75	Knoble
31	3019 "	86.25	Knouby
32	3217 "	91.90	Knuble
33	3421 "	97.70	Knurlp
34	3632 "	103.75	Kvalat
35	3848 "	109.90	Kobold
36	4072 "	116.30	Kohlra
37	4301 "	122.80	Kokoba
38	4536 "	129.55	Koreto
39	4778 "	136.50	Korime
40	5027 "	143.60	Koupho

Prices F. O. B. Factory

Intermediate sizes not specified above, take next higher list.

All list prices in this catalog are subject to discount.



Mill and Cyanide Plant of the Waterson Gold Mining Co., Ltd.,
Ocampo, Chihuahua, Mexico

Filter Cloths

Burlap Filters

Cut to circle, sewed and hemmed

			Code Name
Price per square foot	.10 ounce	$0.02	Kraken

Hop Cloth Filters

Cut to circle, sewed and hemmed

Price per square foot	.24 ounce	.04	Kramat

Duck Filters

Cut to circle, sewed and hemmed

Price per square foot	8 ounce	.04	Krangl
Price per square foot	10 ounce	.05	Krauri
Price per square foot	12 ounce	.06	Kremli

Cocoa Matting Filters

Price per square foot		.10	Kreutz

Figure square of diameter and multiply by price

Filter cloths are cut to a diameter 6 inches larger than the outside diameter of tank unless otherwise specified.

Cocoa matting cut to inside diameter of tank.

Adjustable S Wrenches

FOR TANK WORK

Size	10″	12″	14″
Opens	$1\frac{3}{8}$″	$1\frac{5}{8}$″	2″
Price each	$1.50	$2.00	$2.80
Code Name	Krukat	Kruler	Krumho

All list prices in this catalog are subject to discount.

Bottom Discharge Doors

Square Pattern

Size of Opening	Shipping Weight	List Price	Code Name
10″x 10″	90 lbs.	$10.00	Kufice
12″x 12″	100 "	11.00	Kuhnia
16″x 16″	160 "	15.50	Kurdin

These discharge doors consist of heavy cast-iron frames with iron doors attached by bolt hinges. They are kept water-tight by means of rubber gaskets placed around the edge of the door proper.

Pressure is brought to bear on the gasket by hand wheel.

Bottom Discharge Doors

Round Pattern

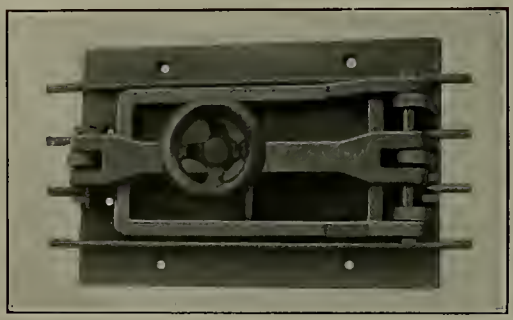
Size of Opening	Shipping Weight	List Price	Code Name
8″	60 lbs.	$ 9.00	Kurile
12″	90 "	11.00	Kusire
16″	130 "	14.00	Kyanet

These doors are intended for customers who prefer the round opening to the square.

All list prices in this catalog are subject to discount.

Side Discharge Doors

Size of Opening	Shipping Weight	List Price	Code Name
8″x 8″	66 lbs.	$ 9.00	Labaru
8″x 12″	81 "	10.50	Labefa
8″x 16″	135 "	15.00	Labelt



Give outside diameter of tank when ordering side discharge doors. We will then have them cast so that they will properly fit circumference of tank. (State thickness of staves.)

Plug Discharge Doors

Size of Opening	Shipping Weight	List Price	Code Name
6" dia.	40 lbs.	$5.00	Labeon
8" "	60 "	6.50	Labiat
10" "	80 "	8.00	Labili

Bottom discharge plugs are used where it is not desirable to open doors from below tank.

These plugs are removed from inside by means of handle extending to top of tank.

Refer to page 107 for useful information.

Description of Lathe

During the past year we have made several important improvements in our Zinc Lathes, and discontinued to manufacture the Lathes formerly listed as No. 1 and No. 2. Our improved Lathes will now be known as No. 3 and No. 4, and superior to any machine on the market for cutting zinc shavings.

The working parts of the No. 3 Lathe are on the front part of the machine. The cutting tool is larger and more easily adjusted. The mandril is 6" in diameter, cast with a hollow center, allowing a free circulation of air, preventing the zinc from over-heating. The shavings when cut, fall by gravity from the cutting tool to the floor. The machine is designed to cut three (3) thicknesses of shavings, 500, 800 and 1600 to the inch. This is accomplished by adjusting the eccentric so that the pawl will take 1, 2 or 3 notches in the ratchet wheel.

DIRECTIONS FOR INSTALLING AND OPERATING THE HAMPTON IMPROVED ZINC LATHE

Upon receipt of Lathe, unpack and attach legs (which in case of No. 3 Lathe are shipped in separate package) to the bed plate of Lathe by inserting 4 draw bolts through the legs and into the bed plate.

Fasten legs to floor, which should be rigid and as free from vibration as possible.

Lathe should be set so belt will pull from side, and a good length of belt should be used.

The Lathe should be elevated so the shavings will have a vertical drop of about 6'; in other words, set the Lathe on the second floor, or platform, and cut a hole for shavings to drop to receptacle below. This weight of shavings will prevent them from winding around the mandril.

After the Lathe is in position and ready to run, thoroughly oil and allow same to run for a short time before winding on supply of zinc.

When Lathe is in good running order and well cleaned, wrap a piece of heavy paper around the mandril and insert the first sheet of zinc in slot, winding it tightly, and just before the end of sheet is reached insert another sheet under the end of the first, continuing this until 8 or 9 sheets have been placed on the mandril. Hold zinc in place by binding with two (2) pieces of wire.

The machine is now ready to operate and care should be taken not to allow the cutting tool to come in contact with the mandril. If the lathe chatters, the power should at once be turned off and cutting tool re-ground. One or more tools should be ground and kept ready to take the place of a dull one.

After loading the mandril, be sure and set the safety spring at the left-hand side of machine so the trip will throw the pawl out of the ratchet wheel and prevent the tool from cutting into the flange at end of mandril.

Be careful and grind the cutting tools on same angles as those furnished with machine. Do not let your machinist experiment with the Lathe, with a view of improving same, as we have already done this; and as zinc is very hard to turn into shavings, we believe the machine, as now constructed, is as good as a zinc lathe can be made.

Hampton Improved Zinc Lathe No. 3

Patented August 14, 1900

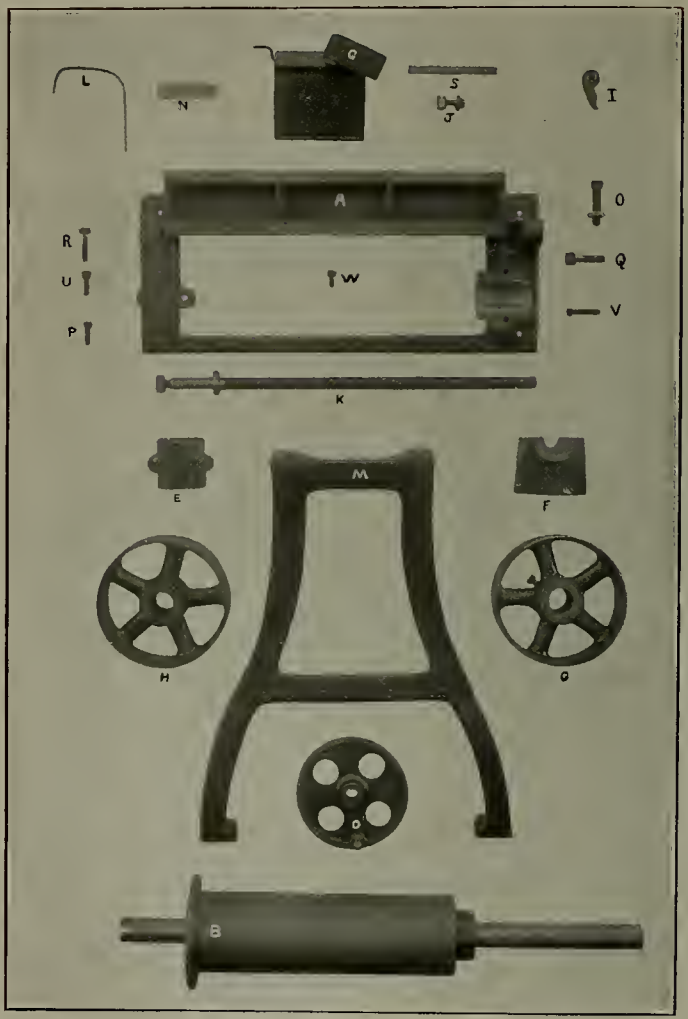
Lathe No.	Shipping Weight	List Price	Code Name
3	450 lbs.	$100.00	Labrax
4	350 "	90.00	Labrum

Capacity, 150 lbs. shavings 8 hours. Height to center of mandril, 36". Speed, 120 revolutions per minute. Size of pulleys, 10"x 4" face. Size of zinc sheets, 18"x 84". Floor space, 24"x 45".

Lathe No. 4 same as No. 3, except it is furnished for bench use without legs.

Tanks furnished from our Puget Sound Factory are manufactured from Washington Fir. Our San Francisco and Los Angeles Factories make a specialty of Redwood Tanks, but are prepared to furnish Fir Tanks when requested.

Extra Parts for Hampton Zinc Lathe



Order by letter or code name, and do not confuse No. 3 and No. 4 Lathes with No. 1 and No. 2 listed in former catalogs.

Price list of extras on next page.

Price List of Extras for Hampton Patent Zinc Lathe

Letter of Part	Name	Actual Weight	List Price	Code Name
A	Bedplate	97 lbs.	$17.00	Labryi
B	Mandril	88 "	31.50	Lacine
C	Toolholder Slide	18 "	7.50	Laceba
D	Ratchet	6½ "	5.00	Lacerf
E	Regular Cap	5½ "	2.00	Lachep
F	Under Pillow Block (goes with A)	12½ "	2.50	Lacini
G	Pulley with Set Screw	21½ "	7.50	Lackad
H	Pulley, loose	21½ "	7.50	Lackey
I	Pawl	½ "	1.50	Laconi
J	Eccentric	¼ "	2.00	Lacque
K	Feed Screw	6½ "	6.00	Lactag
L	Spring Safety Trip	¼ "	2.00	Lactea
M	Leg Casting (one)	49½ "	5.00	Lactif
N	Cutting Tool	1 "	2.00	Lactos
O	Cutting Tool Feed Screw	.....	2.00	Laderl
P	Cutting Tool Set Screw	.....	.50	Ladied
Q	Cap Screw	.....	.50	Ladybi
R	Bed Plate Screw	.....	.50	Laevot
S	Tool Holder Gib	.....	1.00	Lagard
T	Tool Holder Gib Screws (3)	.....	.50	Lagomy
U	Under Pillow Block Screw	.....	.50	Lagopu
V	Adjustment Set Screw	.....	.50	Lagoth
W	Spring Trip Set Screw	.....	.50	Laidle

All list prices in this catalog are subject to discount.

TESTIMONIAL

Ouray, Colo., Jan. 22, 1902.

The Pacific Tank Company,
San Francisco, Cal.

Gentlemen: I have to thank you for your valuable catalog No. 3, which I received today. It contains much valuable information, for which I am very grateful.

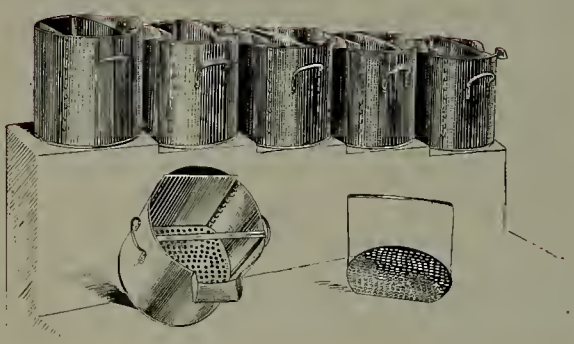
The nine Redwood Tanks we purchased from you some time back have given the greatest satisfaction, and though some of them are in the open, exposed to the weather, they are all entirely free from leakage. We have also some eighteen Steel Tanks in service, as Leaching, Gold Solution, Sump and Storage Vats, and your wood tanks have been equally as satisfactory. On your Zinc Lathe we are cutting some 130 pounds of shavings per day. We altered the feed to suit our purpose, and make a shaving 1/1800 inch in thickness.

The zinc shavings cost us 10 cents per pound here, and the lathe is doing good work for us. I would be glad to receive any new publications from you whenever you issue them.

Yours very truly,
The Camp Bird Cyanide Works,
(Signed) Godfrey Doveton.

Improved Zinc Boxes

Round Pattern



Size of Box	Capacity of Box	Shipping Weight	List Price	Code Name
15″x 15″	1 cu. foot	25 lbs.	$5.00	Laismo
18″x 24″	3 cu. feet	40 "	8.00	Laitop

For some time past we have been furnishing a great number of our Improved Round Pattern Iron Zinc Precipitation Boxes. It will be noticed that the box is made round instead of square. This avoids the necessity of filling out corners.

The iron is thoroughly protected by acid-proof paint, and every box is fitted with a perforated iron shavings tray with handle.

The price quoted is for each box forming one compartment and generally six or more boxes are used in series.

Precipitation Barrels

Code Name, LAITRE

We are in position to quote upon Precipitation Barrels when customers desire to use them instead of our Standard Wooden or Round Iron Zinc Boxes. When requiring price on barrels, please specify size and style desired.

Description of Zinc Boxes

On page 40 we list a few standard sizes of Wooden Zinc Boxes, but we also construct precipitation boxes in accordance with specifications submitted by our customers.

In the construction of our standard sizes, we aim at deep compartments to compel the solution to pass through a thick bed of zinc shavings. The boxes are made very durable and are held together by iron rods which pass vertically and horizontally through the wood. By using this construction it can easily be seen that the solution cannot reach the iron rods which hold the box together. The bottom has a slope of 1" toward the discharge.

All compartments are furnished with improved screen shaving trays.

At the lowest corner of each compartment will be found a rubber compression discharge plug, with screw flange and nipple, to facilitate removing the product from the box at the time of clean-up.

The above does not apply to single compartment sheet-iron boxes shown on page 38.

View of Dolores Mill, Chihuahua, Mexico

Zinc Boxes

Complete with Trays, Screens and Covers

Capacity of Plant	Length of Box	Width of Box	Height of Box	Number of compartments	Shipping Weight	Price without Launder	Code Name
5 to 10 Tons	8′	12″	18″	6	350 lbs.	$ 60.00	Lakely
15 to 20 Tons	12′	18″	24″	7	580 "	75.00	Lamase
25 to 50 Tons	16′	18″	24″	9	780 "	85.00	Lambat
60 to 100 Tons	16′	24″	24″	8	990 "	90.00	Lamben
200 Tons	16′	24″	30″	7	1090 "	100.00	Lambki
500 Tons	18′	24″	36″	8	1290 "	120.00	Lambre

Price on Sheet-Iron Compartment Boxes furnished on application.

Launder or Slime Troughs

Length	Price with Steel Lining	Code Name	Price, Wood Only	Code Name
8′	$12.00	Lamela	$4.00	Lanary
10′	14.00	Lamena	5.00	Lancel
12′	16.00	Lamint	6.00	Lancin
14′	18.00	Lamped	7.00	Landau
16′	20.00	Lampic	8.00	Landfa
18′	22.00	Lampyr	9.00	Langra

The above launders will be found of great value in connection with our Wooden Zinc Boxes when removing the precipitates.

Refer to page 107 for useful information.

Vacuum Clean-up Tank

With Cast Iron Filter Top

Shipping Weight, 300 lbs. List Price, $40.00

Code Name, LANGUO

This tank is specially designed for filtering precipitates from the zinc boxes and is a necessary and valuable adjunct to the clean-up room.

TESTIMONIAL

Ocampo, Chih., Mex., Sept. 14, 1905.

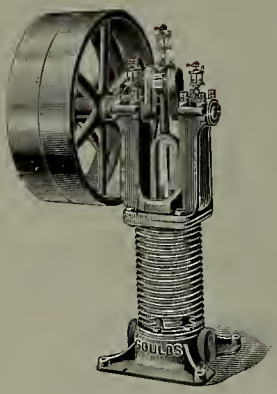
The Pacific Tank Company,
San Francisco, Cal., U. S. A.

Gentlemen: We beg to advise that we have nearly completed erection of tanks; in fact, we commence operations today. So far we may say we have had no trouble.

Tanks went together splendidly and are tight under water. Material arrived in good condition, thanks to your careful packing.

Sincerely yours,
The Waterson Gold Mining Co., Ltd.,
(Signed) W. F. Thompson, General Manager.

Vacuum Pump



Code Name, LANIAR

Shipping Weight, 350 lbs. List Price, $100.00

The saving in time by use of an efficient Vacuum Pump is so well understood that few cyanide plants are erected now that do not specify and use this valuable pump.

The pump (illustrated above) has a 6″ cylinder and 8″ stroke, with a displacement of 230 cubic inches of free air per stroke. It answers every purpose for which such a pump is required.

All parts of this pump coming in contact with cyanide solution are iron fitted.

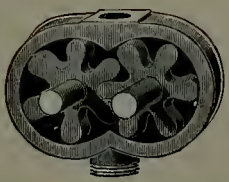
Centrifugal Solution Pumps

Fig. 1902, Without Primer

No.	Discharge Diameter	Suction Diameter	Capacity Gallons per Minute	Shipping Weight	Price, all Iron	Code Name
1½	1½″	1½″	70	90 lbs.	$ 45.00	Lanifi
2	2″	2″	120	120 "	75.00	Lankne
3	3″	3″	265	290 "	110.00	Lansqu
4	4″	4″	470	325 "	130.00	Lantha
6	6″	6″	1060	510 "	225.00	Laodic
8	8″	8″	2000	900 "	310.00	Lapida

For speed table, see page 44

Rotary Force Pumps



No.	Discharge Diameter	Suction Diameter	Size of Pulleys	Gallons per minute 100 Revolutions	Shipping Weight	List Price	Code Name
1	1″	1¼″	8×2½″	10	70 lbs.	$27.00	Lapjoi
2	1″	1½″	8×2½″	13	75 "	32.00	Laplin
3	1½″	1½″	8×2½″	17	80 "	38.00	Lapper
4	1½″	1½″	12×3½″	27	150 "	48.00	Lapsab
5	2″	2″	12×3½″	36	180 "	54.00	Lapsid
6	2½″	2½″	24×4″	45	350 "	80.00	Lapsto

All list prices in this catalog are subject to discount.

Speed of Centrifugal Pumps

Centrifugal pumps should be run at the speed shown in the following table for any required elevation.

If a long line of pipe is used on the suction or discharge, the pumps should be run at a higher speed to overcome the friction of the water in the pipe, or larger pipe should be used.

In estimating the speed necessary for any pump, special care should be taken to provide for this friction loss, and if this is not done, the amount of water discharged will be greatly diminished.

Revolutions and Horse Power Required to Elevate Water to Different Heights

No. Pump	Capacity Gallons	H. P. per Ft. Elev.	5 Ft.	10 Ft.	15 Ft.	20 Ft.	25 Ft.	30 Ft.	35 Ft.	40 Ft.	50 Ft.	60 Ft.
1½	70	.058	642	784	904	1010	1104	1193	1274	1352	1493	1622
1¾	90	.075	473	570	651	724	790	850	906	959	1058	1147
2	120	.10	364	443	511	570	623	672	718	762	840	913
2½	185	.15	389	448	500	547	590	630	667	703	770	830
3	265	.22	286	359	419	475	517	559	599	636	704	766
3½	360	.26	352	413	455	513	555	595	632	667	733	793
4	470	.30	324	390	445	493	539	580	618	654	721	771
5	735	.45	311	368	418	462	502	532	574	606	666	722
6	1060	.59	247	300	345	385	421	453	484	513	566	615
8	2000	1.00	247	300	345	385	421	453	484	513	566	615
10	3000	1.52	160	226	278	320	358	392	424	456	506	555
12	4300	2.00	133	188	230	266	298	326	352	376	421	461
15	7000	3.50	151	213	261	301	337	369	399	426	477	522
18	10000	4.50	151	213	261	301	337	369	399	426	477	522

Pumps of different makes are run at different speeds to deliver the same amount of water.

A simple rule for finding the speed of a centrifugal pump for any given height is as follows: Multiply the square root of the head, in feet, by 500, and then add 500; this result gives the circumferential speed of the pump runner in feet per minute, and, by dividing it by the circumference of the runner, in feet, will give the number of revolutions the pump must run per minute.

Sand and Slime Pumps

Size, Inches	Shipping Weight	List Price	Code Name
2"	300 lbs.	$200.00	Lapwin
3"	500 "	240.00	Laquay
4"	720 "	280.00	Larboa
5"	1000 "	340.00	Larcon
6"	1400 "	420.00	Lardac

Those who have had experience with pumps to be used for handling sand and slime, know that rigidity and durability are the prime features required in a pump for this work. This naturally leads to favoring a design of pump that has interchangeable wearing parts, and that these parts can be quickly and cheaply renewed.

These features were carefully considered in the designing of this pump.

The base and bearing stands are built up and cast in one solid piece. The bearings are both bored at one setting, thus assuring perfect alignment.

The bearings are made of cast iron, turned on the outside and babbited and bored to fit the shaft.

The outboard bearing contains an oil well and two ring oilers, which furnish ample and continuous lubrication for the bearing.

The inboard bearing is fitted with one lubricating ring, a water well, and grooved for distributing clear water for lubrication.

The impellor is of an improved enclosed type of heavy section, so designed that the only part on impellor subject to great wear being the point of entrance of the liquid. At this point, the impellor, the pump casing and side plates are fitted with interchangeable steel rings.

The rings on the impellor are recessed to pass over the projecting ring on the side plates and suction elbow. The velocity of the liquid being slightly accelerated at this point, insures its delivery into the center of the moving impellor with a minimum of wear.

The other part of the pump subject to great wear is the periphery of the scroll chamber. This is taken care of by means of a series of cast iron or steel segments neatly fitted in the collection chamber of the pump and held in place by means of bolts which are fastened from the outside.

By not allowing these liners to remain in the pump until entirely worn down, but replacing with new ones after a reasonable amount of wear, insures the pump being practically indestructable.

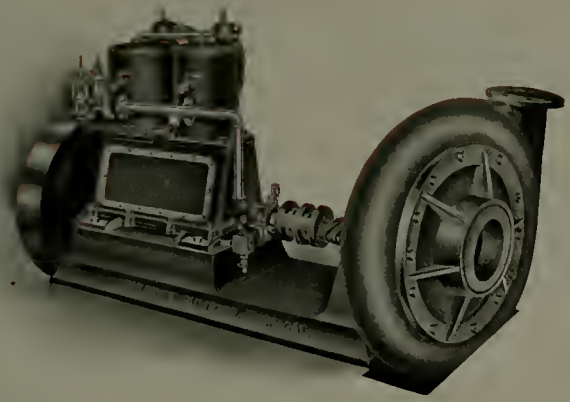
Steam Solution Pumps

No.	Diam of Steam Cyl.	Diam. of Water Cyl.	Length of Stroke	Proper Stroke per min. of one Plunger varying with kind of work and pressure	Gals. delivered min. by both Plungers at stated number of strokes	Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe	List Price	Shipping Weight	Code Name
00	3	2	3	100 to 250	8 to 20	$\frac{3}{8}$	$\frac{3}{8}$	$1\frac{1}{4}$	1	$ 55.00	180	Lardil
1	3	2	$3\frac{1}{2}$	100 " 250	10 " 25	$\frac{3}{8}$	$\frac{3}{8}$	$1\frac{1}{4}$	1	65.00	210	Largen
$1\frac{1}{2}$	4	$2\frac{1}{2}$	4	100 " 200	16 " 32	$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{4}$	83.00	270	Larghe
2	$4\frac{1}{2}$	3	4	100 " 200	25 " 50	$\frac{1}{2}$	1	2	$1\frac{1}{2}$	90.00	310	Largif
3	$5\frac{1}{4}$	$3\frac{1}{2}$	5	100 " 150	50 " 75	$\frac{3}{4}$	$1\frac{1}{4}$	$2\frac{1}{2}$	2	120.00	460	Largot
4	6	4	6	100 " 150	70 " 105	1	$1\frac{1}{2}$	3	2	140.00	630	Larksp
4A	7	$4\frac{1}{2}$	6	100 " 150	85 " 125	$1\frac{1}{4}$	$1\frac{1}{2}$	4	3	193.00	800	Larupe
5	7	$4\frac{1}{2}$	10	75 " 125	100 " 170	$1\frac{1}{2}$	2	4	3	275.00	1050	Larvat
6A	8	5	10	75 " 125	130 " 220	$1\frac{1}{2}$	2	5	4	385.00	2170	Laryng
7A	10	6	10	50 " 100	125 " 250	2	$2\frac{1}{2}$	5	4	425.00	2280	Lascar
8	12	7	12	50 " 100	200 " 400	$2\frac{1}{2}$	3	6	5	600.00	3700	Lascio

Size inches	Gall. per min. 100 strokes	Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe	Shipping Weight	List Price	Code Name
3x2x4	10	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	$1\frac{1}{4}$ in.	1 in.	260 lbs.	$ 57.00	Laserw
$4\frac{1}{2}$x3x4	24	$\frac{3}{4}$ "	1 "	2 "	$1\frac{1}{2}$ "	530 "	98.00	Lahern
$5\frac{1}{2}$x$3\frac{1}{2}$x5	40	$\frac{3}{4}$ "	1 "	$2\frac{1}{2}$ "	2 "	810 "	110.00	Lasket
6x4x6	66	1 "	$1\frac{1}{2}$ "	3 "	2 "	900 "	139.00	Lasitu
7x4x10	108	$1\frac{1}{2}$ "	2 "	4 "	3 "	1600 "	224.00	Lassob
7x$4\frac{1}{2}$x10	138	$1\frac{1}{2}$ "	2 "	4 "	3 "	1600 "	224.00	Lastin
7x5x10	160	$1\frac{1}{2}$ "	2 "	4 "	3 "	1750 "	243.00	Lataki
8x5x10	160	$1\frac{1}{2}$ "	2 "	4 "	3 "	1850 "	265.00	Latcho
9x6x10	244	$1\frac{1}{2}$ "	2 "	5 "	4 "	1910 "	277.00	Lalens
10x6x12	292	2 "	$2\frac{1}{2}$ "	5 "	4 "	2650 "	354.00	Latesc
10x7x12	395	2 "	$2\frac{1}{2}$ "	6 "	5 "	3600 "	465.00	Latexn
12x8x12	520	$2\frac{1}{2}$ "	3 "	6 "	5 "	3600 "	510.00	Lather

These Pumps are iron fitted, made especially for pumping cyanide solution.

Gasoline Pumping Outfit



Price upon application **Code Name, LATICE**

The above is a combination of a high duty centrifugal pump and gasoline engine, carefully designed for conditions where space and high efficiency are desirable features. The pump is of a special high duty pattern, with propellor fitted to suit speed of engine.

The engine is designed with a view of maintaining continuous service, without necessitating close attention and costly repairs.

All bearings are fitted with automatic ring oilers, crank pins with centrifugal and splash oilers, thus assuring ample lubrication at all times. The engines are built with one, two, three or four cylinders as the horse power or conditions require, but are of simple construction and first-class in every particular.

Necessary Appliances for Clean-up Room

1 Set of Irons for bullion furnace.

2 No. 60 Crucibles.

3 Cast Iron Roasting Pans.

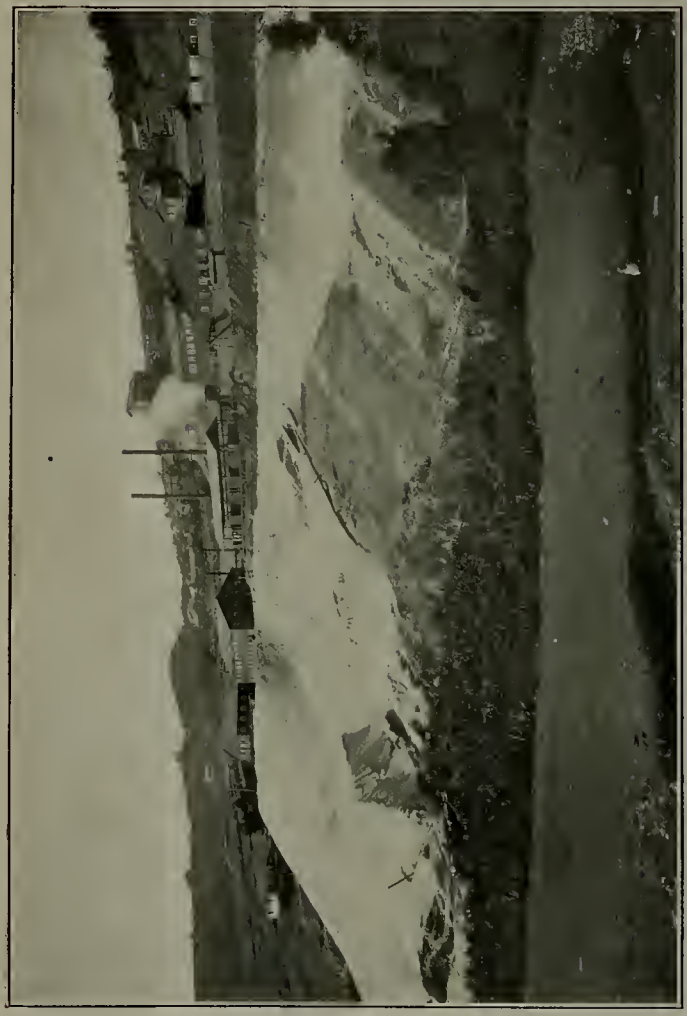
1 Over-head Trolley, Crane and Chain Block for lifting and conveying crucibles.

1 Vacuum Clean-up Tank with cast iron filter top.

1 Small Wooden Sulphuric Acid Tank with stone faucet.

1 6″x 8″ Vacuum Pump.

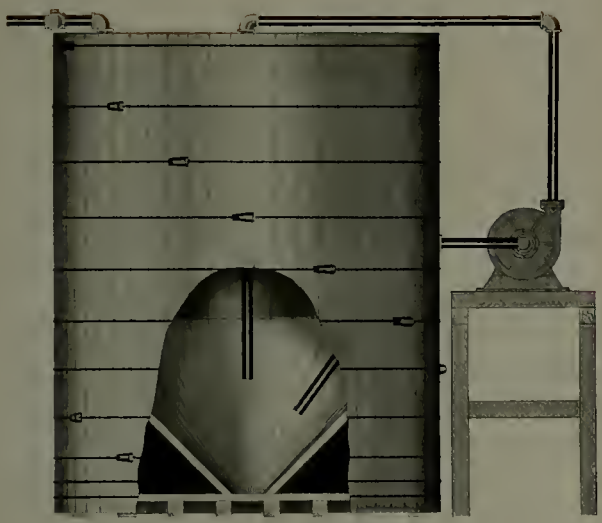
The above specifications are for plants with a capacity of 50 to 100 tons, but many of these articles will be found valuable in smaller plants.



The El Oro Mill and Cyanide Plant, El Oro, Mexico

Agitation

By Centrifugal Pump



Code Name, LAUDIB

This arrangement is used at many cyanide plants, particularly with the agitation of slime in connection with decantation or filter pressing. One advantage is that agitation can be readily started even if the material is settled compactly on the bottom of the tank, because the suction pipe being connected by a loose elbow, can be raised from the bottom to the top of charge, suction started, and as the material loosens up, the weight of the pipe will cause it to gradually settle until finally the suction takes place at the bottom of the tank.

Price will be furnished upon application for tank complete as illustrated above. State size tank required.

TESTIMONIAL

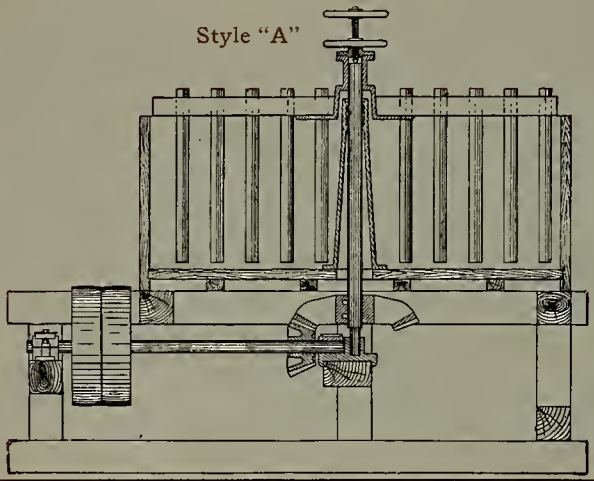
Pacific Tank Company, Olympia, Wash., Aug. 5, 1905.
Olympia, Wash.

Gentlemen: The two Patent Non-Shrinking Oil Tanks, which you erected for us at our pumping station in accordance with your contract, are entirely satisfactory, and we will be pleased to give you future orders.

The tanks are made of Washington Fir, as described in your catalog No. 5, page 20. Very truly, Olympia Water Works,
(Signed) Chas. M. Bolton.

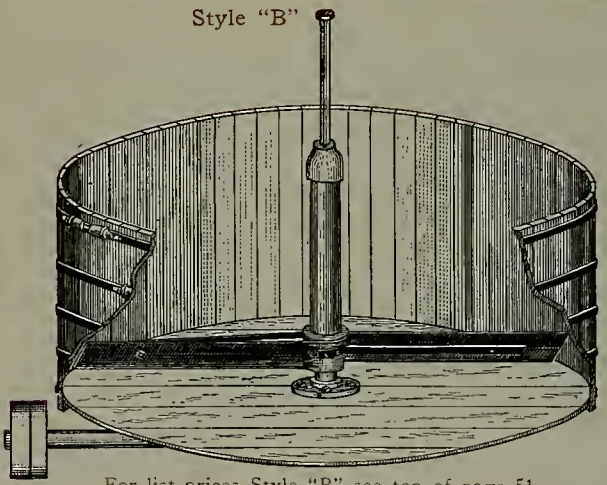
Mechanical Agitators

Style "A"



Diameter of Tank, Feet	Height of Tank, Feet	Shipping Weight	List Price	Code Name
6	5	500 lbs.	$120.00	Laudan
8	6	525 "	130.00	Launce
10	6	550 "	140.00	Launda
12	6	575 "	150.00	Laurea

Style "B"



For list prices Style "B" see top of page 51.

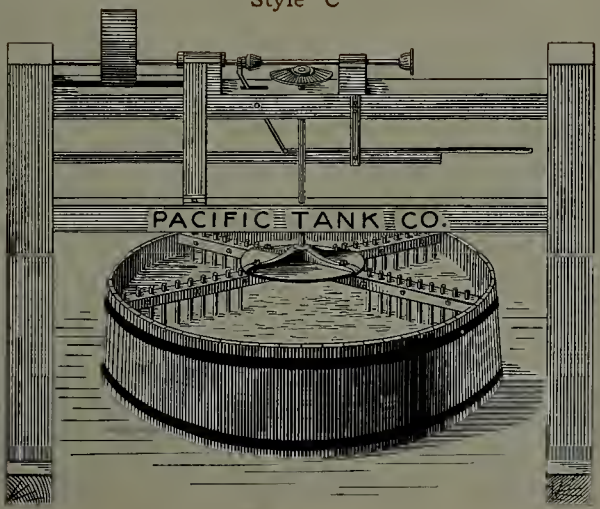
Mechanical Agitators—Continued

Diameter of Tank, Feet	Height of Tank, Feet	Shipping Weight	List Price	Code Name
6	5	500 lbs.	$100.00	Laurin
8	6	525 "	110.00	Lauskr
10	6	550 "	120.00	Lautir
12	6	575 "	130.00	Lavare

The above list prices cover the agitator only, complete as shown in illustration (Style "B"), on page 50, but without pulleys, tank or frame work.

Price on special sizes or upon customers' specifications furnished on application.

Style "C"



Agitator used in Copper Leaching Process

Diameter of Tank, Feet	Height of Tank, Feet	Shipping Weight	List Price	Code Name
8	3	500 lbs.	$100.00	Lavato
9	3	525 "	110.00	Lavemo
10	3	550 "	120.00	Lavish
12	3	575 "	130.00	Lavolt
14	3	600 "	140.00	Lawbin

The iron work and stirring arrangement is furnished complete as shown in cut, but price does not include pulleys, frame work or tank.

Price on special sizes quoted upon application.

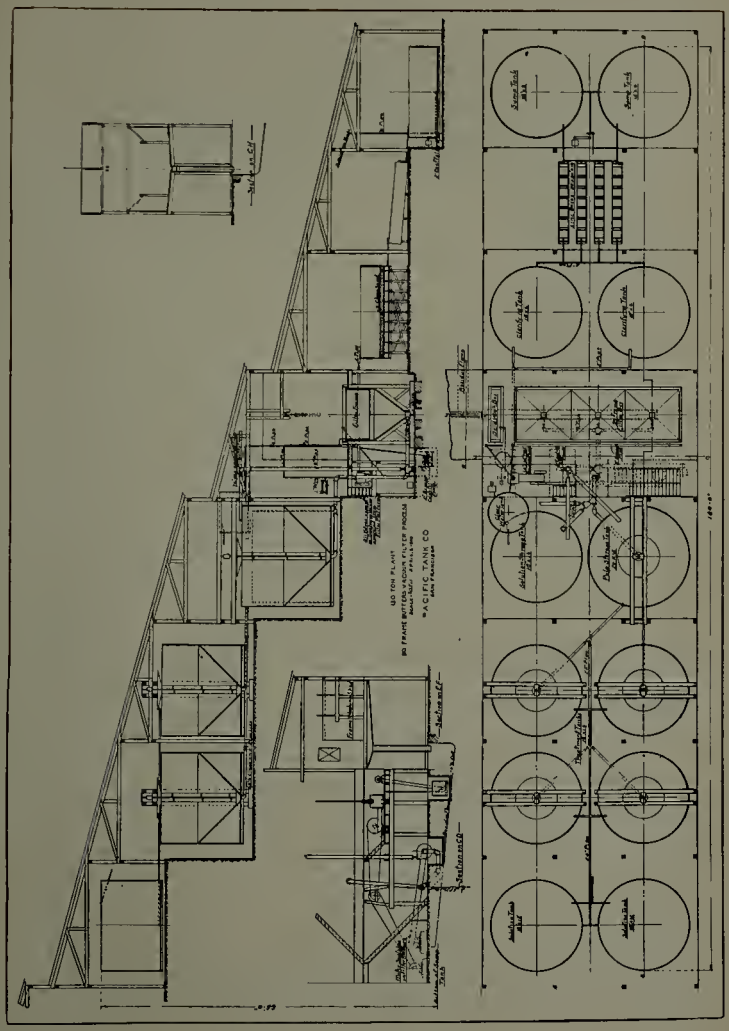
Emery Grinder No. 0

Complete with Counter Shaft and Emery Wheel

Code Name, ORGANP

Shipping Weight, 40 lbs. Price, $20.00

Experimental Plant of The Oriental Con. Mining Co., at Chittabalbie, Korea.
Tanks manufactured by Pacific Tank Company.
We ship Tanks and Cyanide Plants to all parts of the mining world.



One Hundred Fifty Ton-Slime Plant, showing Ninety-Frame Butters' Vacuum Filter Process and P. K. Wood Pump Company's Agitator Pumps.
This Plant was built and furnished by the Pacific Tank Company.

Filter Presses

WITH SQUARE PLATES AND FRAMES

Size of Plate	Number of Plates	Number of Frames	Thickness of Cake	Capacity in Cubic Feet	Working Pressure	Weight of Press	List Price F.O.B. Factory	Code Name
	10	11		.6	150 lbs.	1150 lbs.	$285.00	Lawcal
12″	15	16	1″	.9	to	1350 "	350.00	Lawmak
	20	21		1.2	sq. in.	1550 "	390.00	Lawnde
	15	16		2.2		2650 lbs.	475.00	Lawsui
	20	21		2.9	150 lbs.	3150 "	557.00	Laxati
18″	25	26	1″	3.6	to	3650 "	640.00	Laxnes
	30	31		4.3	sq. in.	4150 "	722.00	Layeri
	35	36		5.0		4650 "	805.00	Laymat
	20	21		5.3		5050 lbs.	822.00	Layrac
	25	26		6.6	150 lbs.	5725 "	932.00	Lazuli
24″	30	31	1″	7.9	to	6400 "	1044.00	Lazaro
	35	36		9.2	sq. in.	7075 "	1153.00	Lerpno
	40	41		10.5		7750 "	1250.00	Lerque
	25	26		16.3	100 lbs.	14900 lbs.	1522.00	Lersiv
36″	30	31	1″	19.5	to	16775 "	1663.00	Lesvix
	35	36		22.7	sq. in.	18650 "	1803.00	Lesvot
	40	41		25.9		20525 "	1943.00	Letwam

WITH ROUND PLATES AND FRAMES

	10	11		.3	150 lbs.	800 lbs.	$179.00	Mablen
12″	15	16	¾″	.5	to	975 "	210.00	Macade
	20	21		.7	sq. in.	1150 "	240.00	Macaol
	15	16		1.8		2200 lbs.	387.00	Macaro
	20	21		2.4	150 lbs.	2625 "	452.00	Macawn
18″	25	26	1″	3.0	to	3050 "	517.00	Macabo
	30	31		3.6	sq. in.	3475 "	582.00	Maceal
	35	36		4.2		3900 "	647.00	Machai
	25	26		12.1	100 lbs.	13350 lbs.	1400.00	Macign
36″	30	31	1″	14.4	to	15100 "	1530.00	Mackle
	35	36		16.7	sq. in.	16850 "	1660.00	Macrob
	40	41		19.0		18600 "	1788.00	Macula

The above prices do not include cloth or paper for Filter, as supply of the particular kind required is usually purchased at the time order for Filter Press is placed.

Automatic Distributors

THE automatic distributor illustrated on the following page is intended to take the tailings as they come direct from the stamps and distribute them evenly over the entire area of the tank.

These distributors are manufactured in two types, one known as the overhead automatic distributor and the other as the supported or standpipe type.

The overhead distributor is mounted on a track, making it possible to transfer from one leaching vat to another, thereby saving the expense of having one distributor for each vat. Where it is not practical to use the overhead distributor, the supported or standpipe distributor can be used.

These distributors consist of a hopper which receives the tailings and discharge pipes which distributes them.

The pipe extensions are of different lengths in order to distribute the tailings over the entire surface of the tank.

In the construction of this distributor, we have adhered to the general principle of the well-known Butters Type, with the exception that the one manufactured by us revolves on ball bearings, making it much more effective and easily operated.

TESTIMONIAL

Park City, Utah, Dec. 11, 1906.

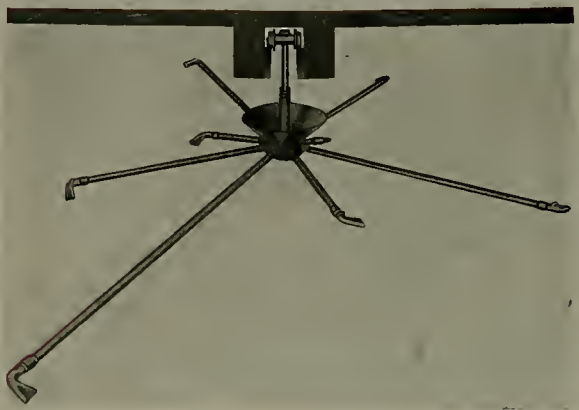
Pacific Tank Company,
San Francisco, Cal.

Gentlemen: Enclosed please find New York draft payable to your order for $698.00; this is the amount due you for car of tanks shipped to the Salt Lake Engineering Works.

I wish to thank you for the careful manner in which the tanks were marked.

Respectfully yours,
(Signed) F. W. Sherman, C. E.

Automatic Distributors



SUSPENDED TYPE

Style "A"	Diameter of Tank Feet	Shipping Weight	List Price	Code Name	Style "B"	Diameter of Tank Feet	Shipping Weight	List Price	Code Name
8 Arms	10 to 14	437 lbs.	$51.00	Madalp	12 Arms	22 to 26	572 lbs.	$69.00	Madalq
"	16 " 20	473 "	54.00	Madart	"	28 " 32	620 "	73.00	Madari
"	22 " 26	486 "	56.00	Madanf	"	34 " 38	660 "	77.00	Madasc
"	28 " 32	515 "	58.00	Madali	"	40 " 44	749 "	84.00	Madazu
"	34 " 38	547 "	60.00	Madafo	"	46 " 50	792 "	88.00	Madaxo

STAND PIPE TYPE

Style "C"	Diameter of Tank Feet	Shipping Weight	List Price	Code Name	Style "D"	Diameter of Tank Feet	Shipping Weight	List Price	Code Name
8 Arms	10 to 14	447 lbs.	$50.00	Madeaf	12 Arms	22 to 26	602 lbs.	$68.00	Madelp
"	16 " 20	483 "	53.00	Madeca	"	28 " 32	650 "	72.00	Madeni
"	22 " 26	496 "	54.00	Madedo	"	34 " 38	690 "	76.00	Madeop
"	28 " 32	525 "	57.00	Madefl	"	40 " 44	779 "	83.00	Madequ
"	34 " 38	557 "	59.00	Madegp	"	46 " 50	822 "	87.00	Madexy

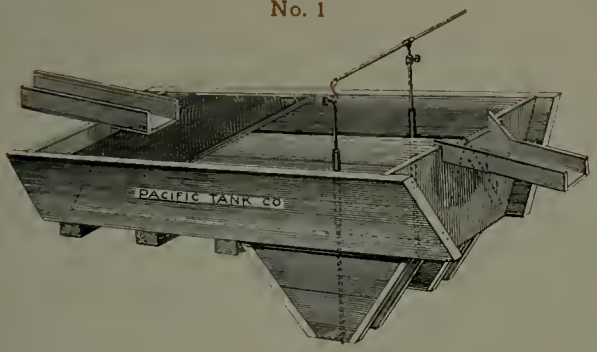
As stated on page 55, it is only in special cases that Style "C" or "D" distributors are used, because a separate distributor must be ordered for each leaching tank, while one distributor of the style described on page 55 will answer for any number of tanks.

When ordering distributors, it is necessary to specify the amount of tailings per hour that will pass through the distributor, in order that the correct size of piping may be furnished. Also give inside diameter of tank.

Refer to page 107 for useful information.

Hydraulic Classifiers

No. 1

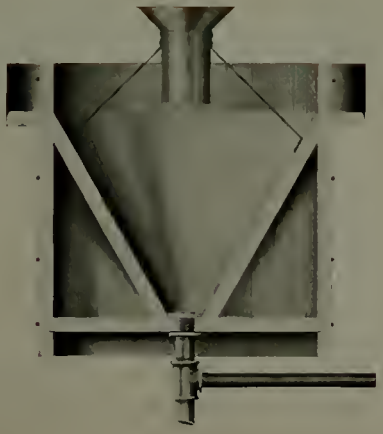


Shipping Weight, 450 lbs. List Price, $130.00

Code Name, MADEIR

The above illustration shows a Hydraulic Classifier of simple construction. It can be readily adjusted to separate any percentage of slime by increasing the volume of the uprising current of water.

No. 2



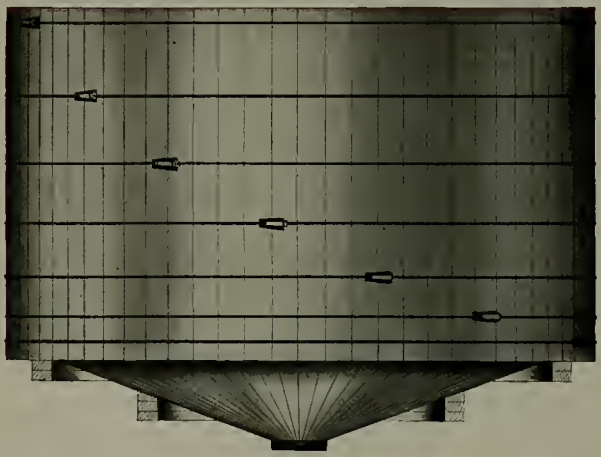
Shipping Weight, 300 lbs. List Price, $30.00

Code Name, MADEMO

This style of classifier is known as the Cone Classifier, and is one of the most efficient types of hydraulic classifiers that can be used for the separation of sand and slime. The pulp as it comes from the battery is received in the small hopper at the top of the classifier, which discharges it near the bottom of the cone, where it meets the uprising current of water. The sand, being heavier, naturally sinks to the bottom, and slime, being of much lighter gravity, is held in suspension and overflows into a circular launder. From this point it is carried to the slime plant, the sand going direct from the bottom of the cone to the sand plant. The above classifier is 3′ diameter x 3′ stave, but we can make them any desired size to order.

Patent Conical Bottom Settling Tank

Bottom Sloping 20°



Patented Aug. 18, 1903

The above illustration represents a tank 10′ diameter x 6′ vertical staves, and will be furnished complete with segmental foundation supports and conical casting, as shown above.

Segmental supports on all conical bottom tanks are re-inforced with wide flat steel hoops and malleable iron lugs.

For list prices see page 59.

Patent Conical Bottom Settling Tanks

Bottom Sloping 20°

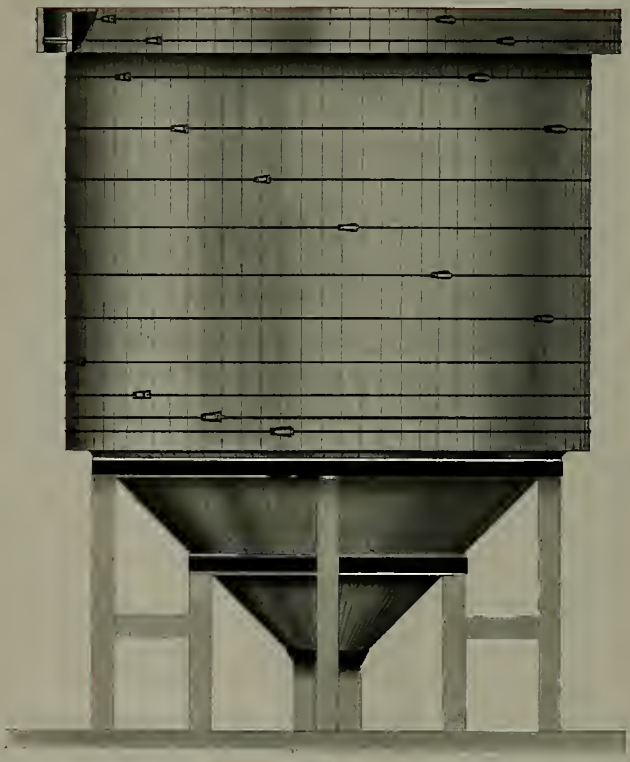
Capacity Tons of Pulp	Outside Diam. of Tank Ft.	Outside Length of Stave Ft.	Thickness of Vertical Stave	Thickness of Cone Stave	Approximate Shipping Weight	List Price	Code Name
4	6	5	2″	3″	1203 lbs.	$ 87.00	Madgeh
5	6	6	2″	3″	1303 "	93.00	Madhou
6	6	7	2″	3″	1402 "	98.00	Madiat
7	6	8	2″	3″	1502 "	104.00	Maestr
6	7	5	2″	3″	1415 "	99.00	Magazi
7	7	6	2″	3″	1530 "	105.00	Magica
9	7	7	2″	3″	1640 "	112.00	Magilp
10	7	8	2″	3″	1756 "	118.00	Magist
8	8	5	2″	3″	1655 "	113.00	Magnam
10	8	6	2″	3″	1788 "	120.00	Magpie
12	8	7	2″	3″	1919 "	127.00	Maguey
14	8	8	2″	3″	2050 "	135.00	Mahale
16	8	9	2″	3″	2181 "	142.00	Mahlst
11	9	5	2″	3″	1906 "	126.00	Mahoga
13	9	6	2″	3″	2054 "	134.00	Maidan
15	9	7	2″	3″	2201 "	142.00	Maidpa
18	9	8	2″	3″	2349 "	151.00	Maihem
20	9	9	2″	3″	2496 "	159.00	Mailab
14	10	5	2″	3″	2247 "	144.00	Mainbo
17	10	6	2″	3″	2411 "	153.00	Majoli
20	10	7	2″	3″	2574 "	162.00	Malaga
22	10	8	2″	3″	2738 "	171.00	Malaxa
25	10	9	2″	3″	2901 "	180.00	Malcon
28	10	10	2″	3″	3065 "	189.00	Maleco
25	12	6	2″	3″	3052 "	189.00	Malich
34	12	8	2″	3″	3447 "	211.00	Malign
42	12	10	2″	3″	3842 "	232.00	Malthu
35	14	6	3″	3″	4931 "	273.00	Malvan
47	14	8	3″	3″	5736 "	308.00	Malves
58	14	10	3″	3″	6558 "	345.00	Mamelo
47	16	6	3″	3″	5828 "	318.00	Mamoth
63	16	8	3″	3″	6739 "	358.00	Manael
78	16	10	3″	3″	7991 "	401.00	Manaki
61	18	6	3″	3″	6988 "	385.00	Manatu
81	18	8	3″	3″	8012 "	430.00	Mapmou
100	18	10	3″	3″	9077 "	478.00	Marabo
78	20	6	3″	3″	8462 "	460.00	Marand
102	20	8	3″	3″	9642 "	513.00	Marach
126	20	10	3″	3″	10839 "	567.00	Maraye

Prices on tanks of greater diameter and longer vertical staves will be quoted upon application.

All list prices in this catalog are subject to discount.

Patent Conical Bottom Settling or Agitating Tanks

Bottom Sloping 45°



Patented Aug. 18, 1903

The above illustration represents a tank 12′ diameter x 10′ vertical staves.

Segmental supports on all conical bottom tanks are re-inforced with wide flat steel hoops and malleable iron lugs.

For prices exclusive of launder, foundation posts or braces, but including segmental supports, see page 61.

Patent Conical Bottom Settling or Agitating Tanks

Bottom Sloping 45

Capacity Tons of Pulp	Outside Diam. of Tank Feet	Outside Length of Stave Feet	Thickness of Vertical Stave	Thickness of Cone Stave	Approximate Shipping Weight	List Price	Code Name
5	6	5	2″	3″	1358 lbs.	$ 95.00	Marcor
6	6	6	2″	3″	1458 "	101.00	Marena
7	7	5	2″	3″	1538 "	106.00	Margar
8	7	6	2″	3″	1654 "	112.00	Maripu
10	7	7	2″	3″	1769 "	118.00	Marjor
10	8	5	2″	3″	1643 "	122.00	Marled
12	8	6	2″	3″	1775 "	129.00	Marlit
13	8	7	2″	3″	1906 "	136.00	Marmal
15	8	8	2″	3″	2038 "	143.00	Marque
13	9	5	2″	3″	2189 "	140.00	Marrot
15	9	6	2″	3″	2337 "	148.00	Marsha
18	9	7	2″	3″	2484 "	156.00	Marsup
20	9	8	2″	3″	2632 "	164.00	Martia
22	9	9	2″	3″	2779 "	172.00	Marvel
20	10	6	2″	3″	2710 "	175.00	Mascle
22	10	7	2″	3″	2882 "	184.00	Mascul
25	10	8	2″	3″	3046 "	193.00	Mashin
28	10	9	2″	3″	3209 "	202.00	Maslin
31	10	10	2″	3″	3373 "	211.00	Masona
30	12	6	2″	3″	3589 "	222.00	Masque
34	12	7	2″	3″	3786 "	232.00	Masaer
39	12	8	2″	3″	3983 "	244.00	Masete
43	12	9	2″	3″	4180 "	254.00	Mastax
47	12	10	2″	3″	4377 "	265.00	Master
43	14	6	3″	3″	5460 "	293.00	Mastif
55	14	8	3″	3″	6165 "	329.00	Mastod
67	14	10	3″	3″	6987 "	365.00	Matche
59	16	6	3″	3″	6548 "	351.00	Matele
75	16	8	3″	3″	7458 "	391.00	Materl
90	16	10	3″	3″	8412 "	434.00	Mathem
106	16	12	3″	3″	9322 "	475.00	Matrim
79	18	6	3″	3″	8055 "	434.00	Matron
99	18	8	3″	3″	9079 "	479.00	Matura
118	18	10	3″	3″	10144 "	527.00	Maudle
138	18	12	3″	3″	11209 "	577.00	Maulst

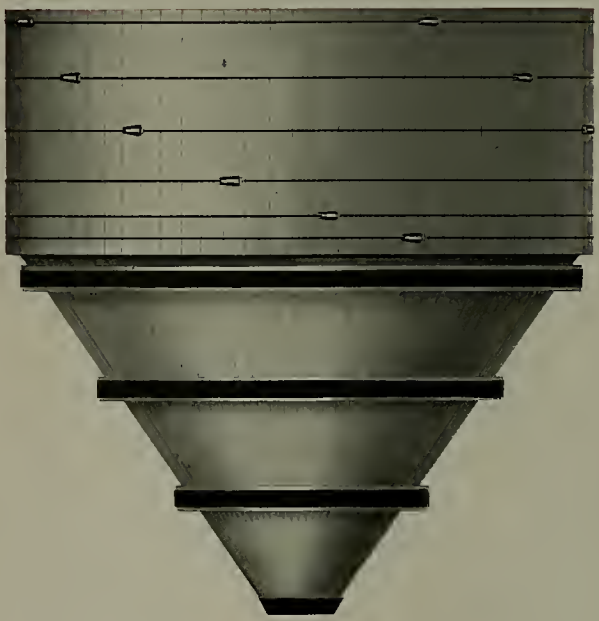
Prices on tanks of greater diameter and longer vertical staves will be quoted on upon application.

The above prices do not include launder, foundation posts or braces, as shown in cut on page 60. Launders will be quoted upon separately, according to the size required.

All list prices in this catalog are subject to discount.

Patent Settling Tanks

With Conical Bottom, Sloping 55°, including Bottom Cone Casting and Segmental Foundation Supports, as shown in cut



Patented Aug. 18, 1903

The above illustration represents a tank 12′ diameter x 5′ vertical staves and 8′ depth of cone. These tanks are manufactured from Redwood or "Washington Fir" lumber, and are furnished complete as shown above. Cone Casting can be threaded for standard pipe up to 6″ in diameter.

Segmental supports on all conical bottom tanks are re-inforced with wide flat steel hoops and malleable iron lugs.

Patent Conical Bottom Tanks

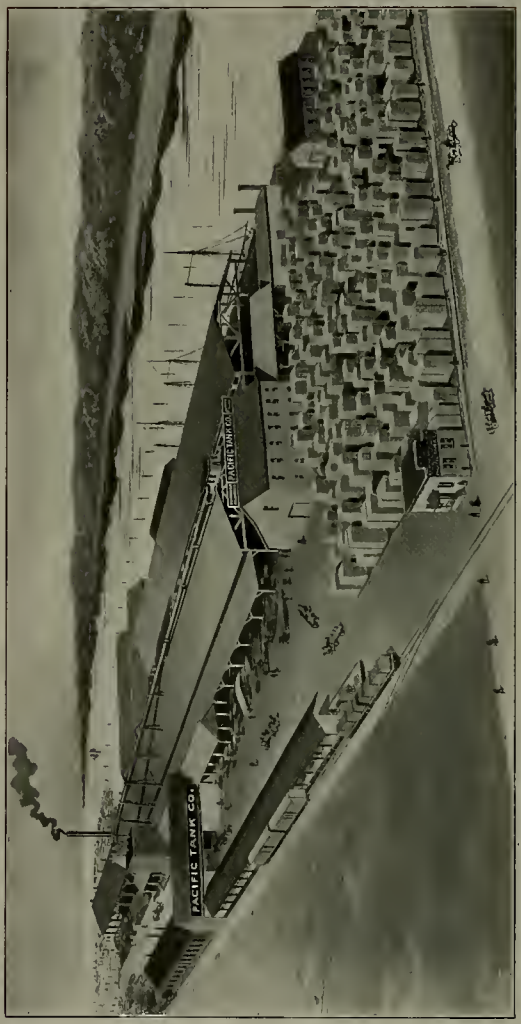
Sloping 55°

Capacity Tons of Pulp	Outside Diam. of Tank Feet	Outside Length of Stave Ft.	Thickness of Vertical Stave	Thickness of Cone Stave	Approximate Shipping Weight	List Price	Code Name
5	6	5	2″	3″	1372 lbs.	$ 96.00	Maunde
6	6	6	2″	3″	1472 "	102.00	Mauthe
13	8	6	2″	3″	2112 "	136.00	Mawkin
14	8	7	2″	3″	2243 "	143.00	Maworm
16	8	8	2″	3″	2375 "	150.00	Maxila
21	10	6	2″	3″	2734 "	190.00	Mayape
24	10	7	2″	3″	3197 "	199.00	Maybug
27	10	8	2″	3″	3361 "	208.00	Mayflo
33	10	10	2″	3″	3688 "	226.00	Mayque
34	12	6	2″	3″	3969 "	240.00	Mazedn
42	12	8	2″	3″	4364 "	262.00	Mazile
51	12	10	2″	3″	4758 "	283.00	Meachy
49	14	6	3″	3″	6195 "	341.00	Meadop
61	14	8	3″	3″	7000 "	377.00	Meadof
73	14	10	3″	3″	7805 "	412.00	Mealph
84	14	12	3″	3″	8644 "	451.00	Mealyn
84	16	8	3″	3″	8171 "	435.00	Meande
99	16	10	3″	3″	9124 "	478.00	Meatbi
115	16	12	3″	3″	10034 "	518.00	Meatin
130	16	14	3″	3″	11050 "	566.00	Mechan
92	18	6	3″	3″	8840 "	482.00	Mecona
112	18	8	3″	3″	9864 "	527.00	Medale
131	18	10	3″	3″	10929 "	575.00	Mediat
151	18	12	3″	3″	11994 "	622.00	Medica
170	18	14	3″	3″	13207 "	681.00	Mefacr
120	20	6	3″	3″	10520 "	568.00	Mefgan
144	20	8	3″	3″	11707 "	621.00	Megwar
169	20	10	3″	3″	12893 "	674.00	Megpan
193	20	12	3″	3″	14079 "	727.00	Mehart
152	22	6	3″	3″	12498 "	677.00	Melont
182	22	8	3″	3″	13805 "	735.00	Melowx
211	22	10	3″	3″	15113 "	794.00	Meling
241	22	12	3″	3″	16500 "	858.00	Mendow

Prices on tanks of larger diameter or longer length of vertical staves will be furnished upon application.

The above prices include segmental foundation supports, but do not include the foundation posts or braces.

Refer to page 107 for useful information.



Our Puget Sound Factory, Olympia, Washington

Assayer's Cyanide Plant

Code Name, NACARA

Shipping Weight, 150 lbs. List Price, $40.00

The above cut illustrates our latest design of a small Cyanide Plant for assaying purposes, having a capacity of from one hundred to two hundred pounds of ore.

The small tank shown at the highest elevation is to be used as a Solution Tank, while the two tanks just below it are intended for Leaching Tanks, and are fitted complete with False Bottoms and Duck Filter Cloths. The Gold Storage Tank is directly under the Leaching Tanks, and below this the Zinc Precipitation Boxes; these boxes are arranged in units so that any number from one to six can be used in making a test.

The piping is so arranged that the solution can be fed to either the top or bottom of Leaching Tanks.

We have recently shipped a number of these new style plants, and from reports received, our customers are highly pleased with the results obtained.

TESTIMONIAL

THE A. VAN DER NAILLEN SCHOOL OF PRACTICAL ENGINEERING

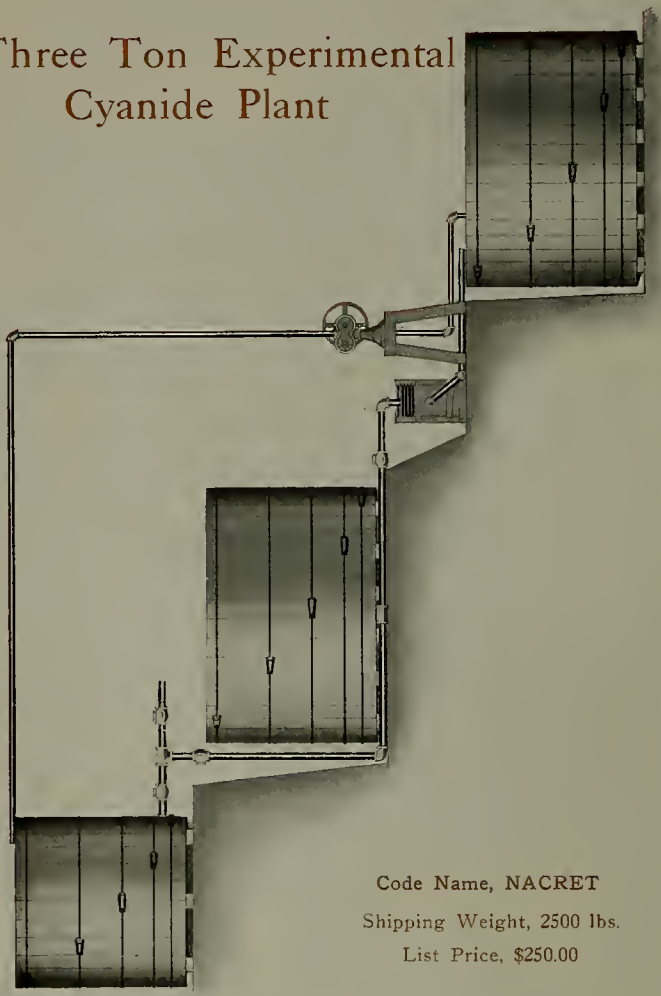
Mr. H. P. Sackett, Manager. Oakland, Cal., May 27, 1907.
Pacific Tank Company,
San Francisco, Cal.

Dear Sir: Your beautiful glass sign arrived O. K. We are just completing an assay building which will have a special department for cyaniding, and your little sign will be an additional ornament. We are only too well pleased to place the same in a conspicuous place to show our appreciation for past favors shown to us by yourself and firm.

The two cyanide plants we purchased from you are giving entire satisfaction.

Yours respectfully,
A. Van der Naillen, Jr.,
U. S. Deputy Mineral Surveyor, Manager.

Three Ton Experimental Cyanide Plant



Code Name, NACRET

Shipping Weight, 2500 lbs.

List Price, $250.00

Complete with all necessary pipe, valves, fittings and cyanide paint.

In addition to the tanks shown in above cut, we include a 4′x 4′ Gold Storage Tank.

The sketch on the preceding page shows a side elevation of our

Three Ton Experimental Cyanide Plant

designed by us to assist the purchaser in determining definitely what style plant is needed for his particular ore. An assayer can determine from the limited quantity of ore under test if a very shallow or deeper leaching tank gives the best results, and often an assayer's test offers no difficulty whatever, when on a larger scale the ore packs and prevents percolations to the solution. To do away with this uncertainty we offer a cheap and efficient method for making preliminary tests. The leaching tank included in this plant is 3½' deep and fitted complete with false bottom and duck filter cloth.

A hand pump is connected with the sump tank by suction pipe in order to pump the solution back to the solution tank.

Detailed plans and specifications are furnished on application, for which we charge the cost of making, and when an order is placed with us, the amount so paid will be credited to the account of our customer, as we furnish plans and specifications gratis with the plant.

Cyanide Paint

ACID PROOF

	List Price	Code Name
5 bbl Lot, per gallon	$1.00	Nacram
1 " " " "	1.10	Nacrop
Less than 1 bbl., per gallon	1.20	Nacsef

This paint is especially prepared to meet the requirements of cyanide operators at mills using the process. It is much cheaper than the mineral paint heretofore introduced or used at cyanide mills.

The paint is absolutely Water Proof, Acid Proof, Brine Proof, Alkali Proof.

It is a thorough preservative of wood and iron.

It is Anti-rust. Nothing has been found that can destroy it.

View of Transito Mine, Honduras

Standard Cyanide Plants

For 24 Hours Contact

Capacity, Tons	Shipping Weight	List Price	Code Name
5	6402 lbs.	$ 555.00	Nadabt
10	11024 "	892.00	Naevos
15	12170 "	957.00	Nafelt
20	15901 "	1200.00	Nageor
25	17619 "	1293.00	Naiant
40	24945 "	1892.00	Nailba
50	35351 "	2271.00	Naivet
60	40391 "	2546.00	Nakedl
75	46823 "	2882.00	Nakerd
100	58990 "	3482.00	Namabl
150	71612 "	4268.00	Napifo
200	89804 "	5127.00	Napkin
300	125291 "	7080.00	Napole
400	183585 "	9838.00	Naptak
500	208803 "	11010.00	Narcis
1000	358901 "	18850.00	Nardin

The specifications given below are for plants up to and including 100 tons capacity. Specifications for larger plants will be furnished upon application.

Two Solution Tanks (one for strong and one for weak solution).

Three Leaching Tanks, fitted with False Bottoms, Filter Cloths and Bottom Discharge Doors.

Two Gold Solution Tanks.

Three Zinc Precipitation Boxes (two for strong and one for weak solution), complete with Covers, Screen Trays and Compression Discharge Plugs.

Two Sump Tanks (except in five-ton plant).

One Solution Pump and all the necessary pipe, pipe fittings, tank connections, cyanide cocks and cyanide paint to complete the plant according to blue prints and complete specifications furnished by us.

The above prices include 100 pounds of zinc shavings for plants up to and including 25 tons capacity. Larger plants are furnished with our No. 3 Patent "Hampton" Zinc Lathe.

By 10-ton, 15-ton, 20-ton plant, etc., it is understood that EACH of the Leaching Tanks contained in such plant has the capacity by which the plant is designated, it being assumed that the solution requires TWENTY-FOUR HOURS CONTACT with pulp, and under such conditions offers uninterrupted treatment; tank No. 1 can be in contact when tank No. 2 is being filled and tank No. 3 discharged.

The list prices in this catalog are subject to a liberal discount.

Tanks furnished from our Puget Sound Factory are manufactured from Washington Fir. Our San Francisco and Los Angeles Factories make a specialty of Redwood Tanks, but are prepared to furnish Fir Tanks when requested.

Standard Cyanide Plants

For 48 Hours Contact

Capacity, Tons	Shipping Weight	List Price	Code Name
5	7570 lbs.	$ 635.00	Narate
10	12800 "	1012.00	Nartix
15	14132 "	1088.00	Nasali
20	18334 "	1356.00	Nasico
25	20439 "	1470.00	Nastil
40	28874 "	2135.00	Nasute
50	42586 "	2634.00	Natkan
60	48810 "	2969.00	Natrol
75	56432 "	3361.00	Naulag
100	71948 "	4118.00	Nautch
150	86317 "	4992.00	Nautil
200	109299 "	6068.00	Navarc
300	149751 "	8251.00	Navicu
400	215539 "	11393.00	Naviga
500	244340 "	12740.00	Nazarh
1000	432777 "	22575.00	Neaped

The specifications given below are for plants up to and including 100 tons capacity. Specifications for larger plants will be furnished upon application.

Two Solution Tanks (one for strong and one for weak solution).

Four Leaching Tanks, fitted with False Bottoms, Filter Cloths and Bottom Discharge Doors.

Two Gold Solution Tanks.

Three Zinc Precipitation Boxes (two for strong and one for weak solution), complete with Covers, Screen Trays and Compression Discharge Plugs.

Two Sump Tanks (except in five ton plant).

One Solution Pump and all the necessary pipe, pipe fittings, tank connections, cyanide cocks and cyanide paint to complete the plant according to blue prints and complete specifications furnished by us.

The above prices include 100 pounds of zinc shavings for plants up to and including 25 tons capacity. Larger plants are furnished with our No. 3 Patent "Hampton" Zinc Lathe.

By 10-ton, 15-ton, 20-ton plant, etc., it is understood that EACH of the Leaching Tanks contained in such plant has the capacity by which the plant is designated, it being assumed that the solution requires FORTY-EIGHT HOURS CONTACT with pulp, and under such conditions offers uninterrupted treatment; tanks No. 1 and No. 2 can be in contact when tank No. 3 is being filled and tank No. 4 discharged.

The list prices in this catalog are subject to a liberal discount.

Standard Cyanide Plants

For 72 Hours Contact

Capacity, Tons	Shipping Weight	List Price	Code Name
5	8738 lbs.	$ 715.00	Nebelt
10	14576 "	1132.00	Nebula
15	16094 "	1218.00	Necesa
20	20767 "	1512.00	Neckat
25	23259 "	1648.00	Necrom
40	32803 "	2378.00	Necrop
50	49821 "	2997.00	Nectar
60	57229 "	3392.00	Negati
75	66041 "	3840.00	Neglec
100	84906 "	4753.00	Negoti
150	101022 "	5716.00	Negroh
200	128794 "	7010.00	Negust
300	174211 "	9422.00	Neighf
400	247493 "	12949.00	Nemean
500	279877 "	14470.00	Nemoph
1000	506653 "	26300.00	Nempne

The specifications given below are for plants up to and including 100 tons capacity. Specifications for larger plants will be furnished upon application.

Two Solution Tanks (one for strong and one for weak solution).

Five Leaching Tanks, fitted with False Bottoms, Filter Cloths and Bottom Discharge Doors.

Three Zinc Precipitation Boxes (two for strong and one for weak solution), complete with Covers, Screen Trays and Compression Discharge Plugs.

Two Sump Tanks (except in five ton plant).

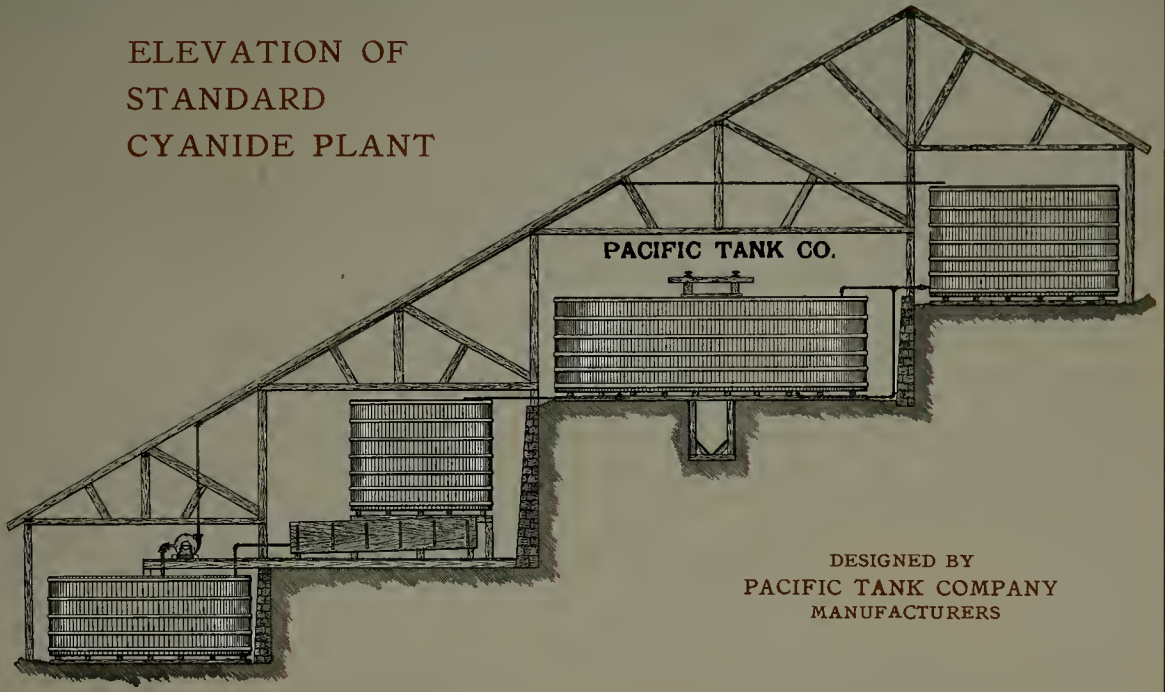
One Solution Pump and all the necessary pipe, pipe fittings, tank connections, cyanide cocks and cyanide paint to complete the plant according to blue prints and complete specifications furnished by us.

The above prices include 100 pounds of zinc shavings for plants up to and including 25 tons capacity. Larger plants are furnished with our No. 3 Patent "Hampton" Zinc Lathe.

By 10-ton, 15-ton, 20-ton plant, etc., it is understood that EACH of the Leaching Tanks contained in such plant has the capacity by which the plant is designated, it being assumed that the solution requires SEVENTY-TWO HOURS CONTACT with pulp, and under such conditions offers uninterrupted treatment; tanks Nos. 1, 2 and 3 can be in contact when tank No. 4 is being filled and tank No. 5 discharged.

The list prices in this catalog are subject to a liberal discount.

ELEVATION OF STANDARD CYANIDE PLANT



DESIGNED BY
PACIFIC TANK COMPANY
MANUFACTURERS

Standard Cyanide Plants

For 24 Hours Contact, Including Vacuum Process

Capacity, Tons	Shipping Weight	List Price	Code Name
5	6890 lbs.	$ 694.00	Nenuph
10	11824 "	1060.00	Nevcom
15	12999 "	1125.00	Nephau
20	16984 "	1383.00	Nepeta
25	18742 "	1477.00	Neptum
40	26445 "	2088.00	Nereid
50	37155 "	2480.00	Nervat
60	42195 "	2755.00	Nescie
75	49291 "	3118.00	Nesteg
100	61471 "	3719.00	Nestle
150	75175 "	4544.00	Netifh
200	94073 "	5436.00	Neutra

The specifications for plants fitted for the Vacuum Process are identical with the plants listed on pages 68, 69 and 70, with the addition of a 6"x 8" Vacuum Pump, as described on page 42, extra pipe, valves and fittings, and the Gold Solution Tanks will be provided with a solid head, manhole and automatic shut-off. See page 13.

It is a well-known fact that by creating a vacuum under the filter of the Leaching Tanks, the drawing off of solution is very much hastened, thereby saving time, which necessarily means a saving of cost in operation.

The above prices include 100 pounds of zinc shavings for plants up to and including 25 tons capacity. Larger plants are furnished with our No. 3 Patent "Hampton" Zinc Lathe.

List prices in this catalog for Cyanide Plants are given to assist our customers in determining the approximate cost of plants of different capacities. We prefer to furnish special specifications and quote special prices rather than to sell by a discount from the lists mentioned.

When the exact size and style of plant is decided upon, send us the necessary information and we will quote our lowest cash prices.

The list prices given above are subject to a liberal discount.

Standard Cyanide Plants

For 48 Hours Contact, Including Vacuum Process

Capacity, Tons	Shipping Weight	List Price	Code Name
5	8058 lbs.	$ 774.00	Nevenp
10	13600 "	1180.00	Newbor
15	14961 "	1256.00	Newfan
20	19417 "	1539.00	Nexibl
25	21562 "	1654.00	Nexust
40	30374 "	2331.00	Naisfn
50	44390 "	2843.00	Nicene
60	50614 "	3178.00	Nichel
75	58900 "	3597.00	Nickar
100	74429 "	4355.00	Nicoti
150	89880 "	5268.00	Nictat
200	113568 "	6377.00	Nidifi

The specifications for plants fitted for Vacuum Process are identical with the plants listed on pages 68, 69 and 70, with the addition of a 6"x8" Vacuum Pump, as described on page 42, extra pipe, valves and fittings, and the Gold Solution Tanks will be provided with a solid head, manhole and automatic shut-off. See page 13.

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The list prices given above are subject to a liberal discount.

Standard Cyanide Plants

For 72 Hours Contact, Including Vacuum Process

Capacity, Tons	Shipping Weight	List Price	Code Name
5	9226 lbs.	$ 854.00	Niello
10	15376 "	1299.00	Nigela
15	16923 "	1386.00	Nighlf
20	21850 "	1695.00	Nigrif
25	24382 "	1832.00	Nihilt
40	34303 "	2574.00	Niloth
50	51625 "	3206.00	Nimbif
60	59033 "	3601.00	Ninfol
75	68509 "	4076.00	Ninsin
100	87387 "	4990.00	Niteny
150	104585 "	5992.00	Nitros
200	133063 "	7319.00	Nizaml

The specifications for plants fitted for the Vacuum Process are identical with the plants listed on pages 68, 69 and 70, with the addition of a 6"x8" Vacuum Pump, as described on page 42, extra pipe, valves and fittings, and the Gold Solution Tanks will be provided with a solid head, manhole and automatic shut-off. See page 13.

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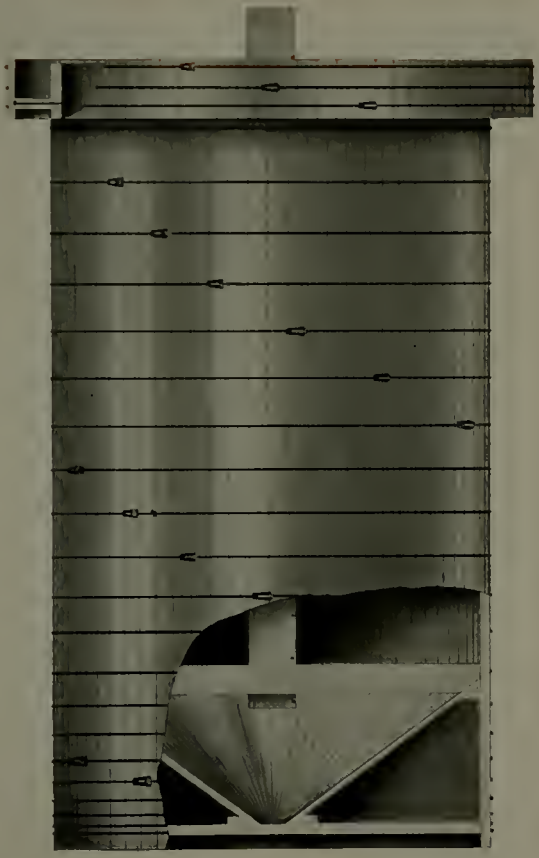
When the exact size and style of plant is decided upon, send us the necessary information and we will quote our lowest cash prices.

The list prices given above are subject to a liberal discount.

Pulp Thickeners



Code Name, **NIZEYH**

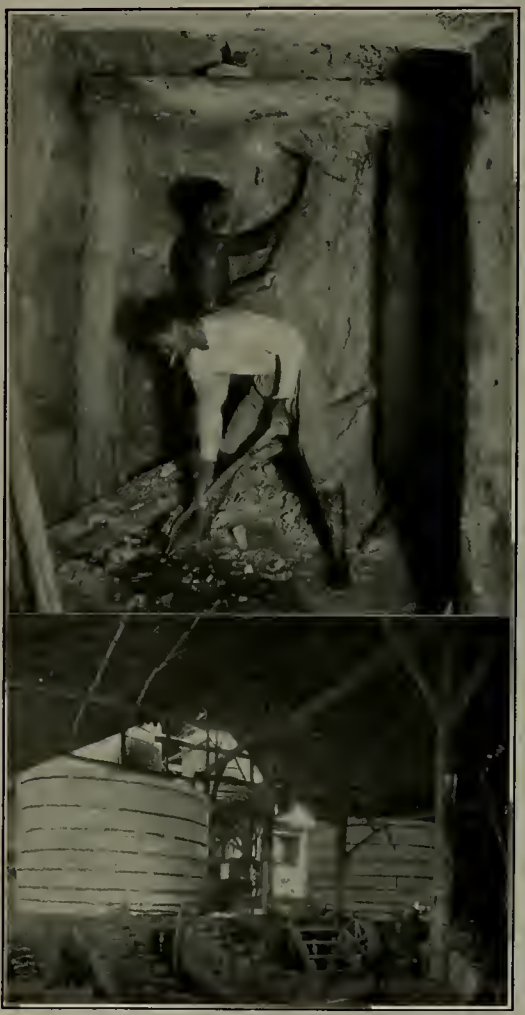
Shipping Weight, 7600 lbs. Price complete as shown in cut, $364.00

The above cut represents our Standard Pulp Thickeners, 10′ diameter x 18′ vertical height, complete with pulp chute, and 9″x 10½″ inside measure overflow launder.

This style of tank is used to receive the fresh battery slimes where agitated with cyanide solution, and is many times used for the purpose of decantation and classifying.

These Pulp Thickeners are used extensively at many large mines, and are giving excellent satisfaction.

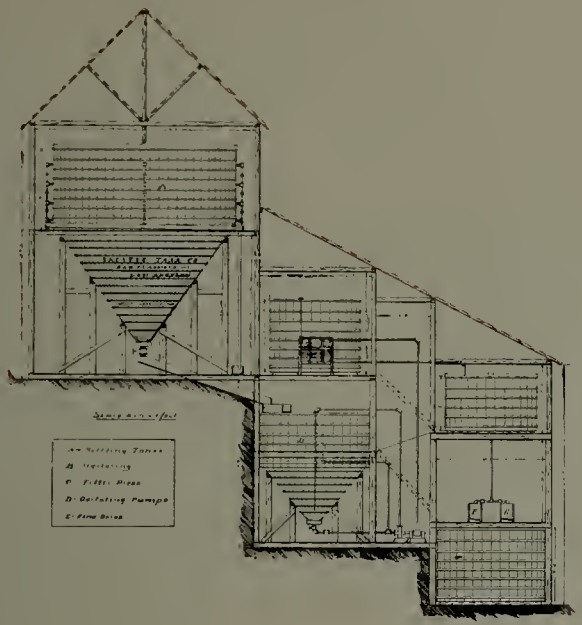
Prices on special sizes will be furnished upon receipt of specifications.



Courtesy of Mr. M. A. Clarke.

Cyanide Plant of the Benguet Consolidated Mining Company, Antimok District, Benguet, Manila, P. I.

Slime Plants



Code Name, NOBLES

We show above a side elevation of slime plant, the specifications of which are as follows:

3 Conical Bottom Settling Tanks.
2 Conical Bottom Agitating Tanks.
1 Centrifugal Agitating Pump.
1 Receiver.
1 Air Compressor.
1 Filter Press.
1 Gold Solution Tank.
1 Standardizing Tank.
2 Sump Tanks.
? Zinc Boxes.

and all necessary pipe, pipe fittings, cyanide cocks, tank connections and acid-proof paint to complete the plant.

Owing to the fact that slime plants are generally furnished on special specifications and different ores require special treatment, we do not list these plants, but will furnish specifications and prices upon receipt of information required. See page 3.

The Decantation Process

Is principally used for extracting values from slime which cannot be leached on account of the slime forming an impervious bed. Therefore the slime is agitated by means of a centrifugal pump attached to the bottom of the tank, and discharging into the top, as illustrated on page 49, or by mechanical agitators or air lifts. When all values have been extracted, the slime is allowed to settle, and clear solution is drawn off from the top of the tank and led into zinc boxes. The slime is next subjected to several washes, with a repetition of agitation, settling and drawing off of clear solution.

Decantation is a slow process and requires a great quantity of water for the separate washings, and for this reason Filter Pressing is often substituted for Decantation.

In Filter Pressing there is only one agitation, which is discontinued as soon as the values are absorbed by the solution.

The next step is to force the contents of the tank into a Filter Press or Filter Leaves, for the separation of solution and solids.

Where a straight Percolation Process cannot be used on account of excess of slime, an experienced cyanide man will always aim to separate just enough slime to allow the remainder to be percolated. It is often found that from 25% to 35% of slime may remain with the sands and still be treated by percolation.

A great deal of attention is being paid at the present time to separating solution from slime by Patent Filter Presses. There are several of these Patent Presses on the market, principal among them being the BUTTERS PATENT FILTERS. For additional information in reference to this particular process, see page 79. We bespeak great success for this method of separating solution from slime, as we know of several plants being successfully operated at the present time. We are prepared to quote prices and submit specifications for complete plant, including the Butters Filter Process.

The Butters Patent Vacuum Filter

Code Name, NOCIVE

One of the most difficult operations in the extraction of gold and silver by the Cyanide Process is the treatment of the slime.

In addition to the expensive agitation, circulation, pumping and aeration necessary for satisfactory extraction, the mechanical condition of the slime is usually such that it gives trouble in settlement for decantation, the subsidence being so slow that the amount of solution recoverable in this is often not enough to make the decantation process a practical success. The problem of separation of the solution from the slime has, however, been solved by the invention of the Butters Patent Filter.

The Butters Patent Vacuum Filter has been in use for over three years, and has proven an unqualified success. A few of the principal features that have resulted in its general adoption by the principal mining companies of the United States and Mexico are:

1. The complete recovery of soluble values.
2. The small amount of wash, either of weak solution or water to make this recovery.
3. The conservation of water, where water supply is limited, the residue (containing no more than 35% of moisture that carries no cyanide to poison the creeks) can be removed by cars or conveyor.
4. All the water that is introduced into the plant for the purpose of maintaining a normal quantity of circulating solutions, comes in through the filters, doing effective work.
5. There is no excess of solution to throw away.
6. There is a minimum quantity of solution containing maximum values for precipitation, thereby necessitating only a small fraction of the zinc box capacity that would be necessary with the bulky decantation process.
7. A great saving in treatment tankage; as the valuable solutions are recovered immediately after treatment and the residue gotten out of the way at once, no time being lost in settling and decanting, the treatment tank capacity is only that necessary for dissolving purposes.
8. The ease and simplicity of operation. One unskilled man per shift will handle

Butters Patent Vacuum Filter

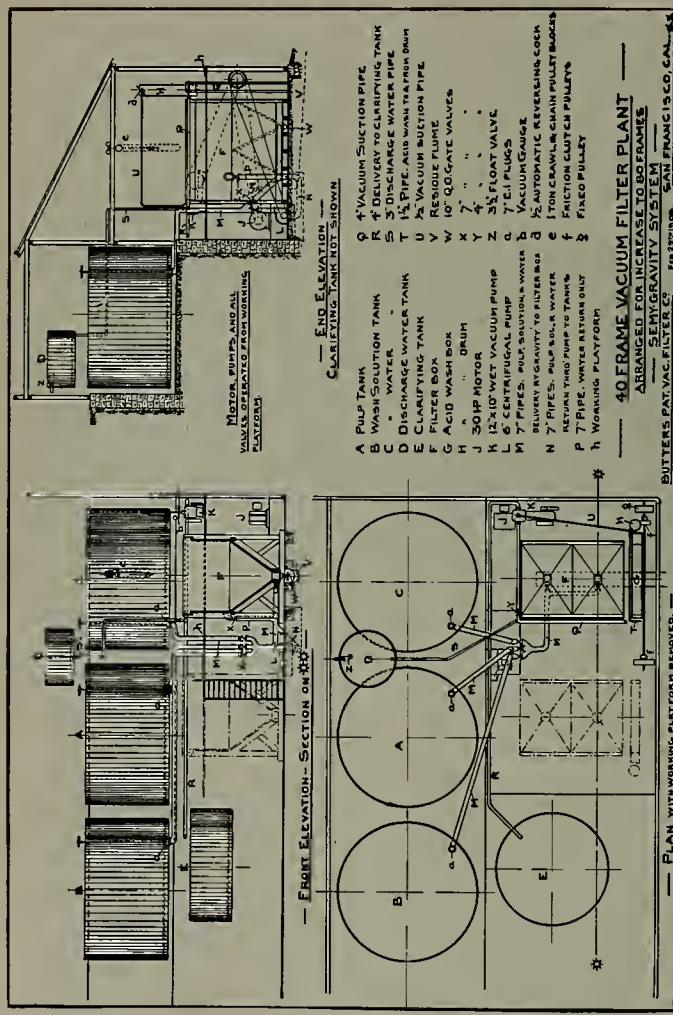
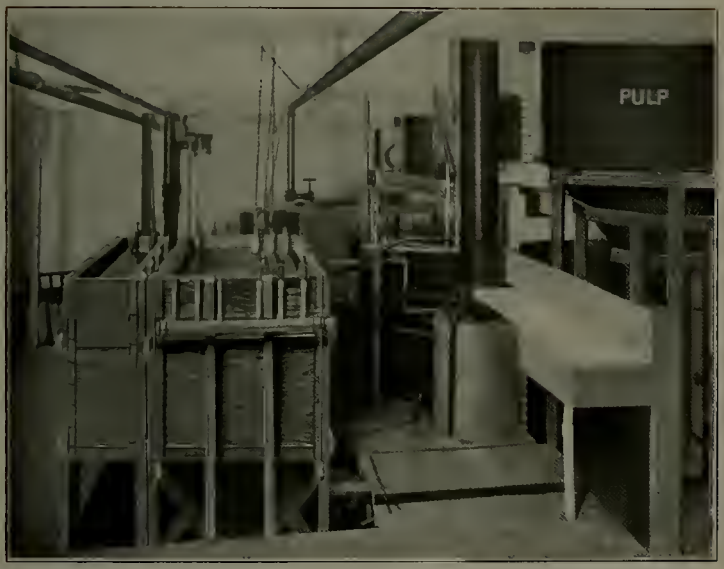

— END ELEVATION —
CLARIFYING TANK NOT SHOWN
MOTOR, PUMPS, AND ALL VALVES OPERATED FROM WORKING PLATFORM.
A PULP TANK
B WASH SOLUTION TANK
C " WATER "
D DISCHARGE WATER TANK
E CLARIFYING TANK
F FILTER BOX
G ACID WASH BOX
H " " DRUM
J 30 HP MOTOR
K 12 X 10" WET VACUUM PUMP
L 6" CENTRIFUGAL PUMP
M 7" PIPES. PULP, SOLUTION & WATER DELIVERY BY GRAVITY TO FILTER BOX
N 7" PIPES. PULP SOL.N & WATER RETURN THRO PUMP TO TANKS
P 7" PIPE. WATER RETURN ONLY
h WORKING PLATFORM
Q 4" VACUUM SUCTION PIPE
R 4" DELIVERY TO CLARIFYING TANK
S 3" DISCHARGE WATER PIPE
T 1½" PIPE. ACID WASH TREATMENT DRUM
U 2½ VACUUM SUCTION PIPE
V RESIDUE FLUME
W 10" GOGATE VALVES
X 7" " "
Y 4" " "
Z 3½" FLOAT VALVE
a 7" E.I. PLUGS
b VACUUM GAUGE
c ½ AUTOMATIC REVERSING GEAR
d 1 TON CRAWL & CHAIN PULLEY BLOCKS
e FRICTION CLUTCH PULLEYS
f FIXED PULLEY
g
— 40 FRAME VACUUM FILTER PLANT —
ARRANGED FOR INCREASE TO 80 FRAMES
— SEMI-GRAVITY SYSTEM —
BUTTERS PAT. VAC. FILTER CO. PAT. SEPT. 18 '06. SAN FRANCISCO, CAL.
— PLAN WITH WORKING PLATFORM REMOVED. —
— FRONT ELEVATION — SECTION ON ✱✱

Illustration of 40 Frame Vacuum Filter Plant

Practically tonnage up to 300 tons of dry slimes per day, except where tramming of the residue is necessary.

9. The small power and maintenance cost. Power will range from 1½ to 3 horse power hours per ton of dry slime treated, depending on the size of the plant, the large plants taking less power. The maintenance, including oil, repairs and acid washing of the filter frames does not exceed 3½ cents per ton of slime treated at the Butters Plant, Virginia City.



View of Plant

The formation of the slime cake is automatic, adjusting itself as the composition of the material varies at any point, the coarser forming a thicker layer than the finer, maintaining an even permeability of the leaf, which is necessary for perfect washing. The time necessary for washing depends upon the character and thickness of the cake, the minimum being about fifteen minutes.

In case the permeability of the leaves grows less, owing to the formation of a precipitate of calcium carbonate in the fibre of the canvas, arrangement is made for removing the frames from the box at long intervals and immersing them in a weak solution of hydrochloric acid. For this purpose an overhead trolley, carrying a differential hoist, is installed to facilitate the handling of the leaves. The frequency of this operation depends on the quantity of lime used in treatment, varying from two to nine months.

The Butters Filter consists essentially of three parts; a series of

Butters Patent Vacuum Filter

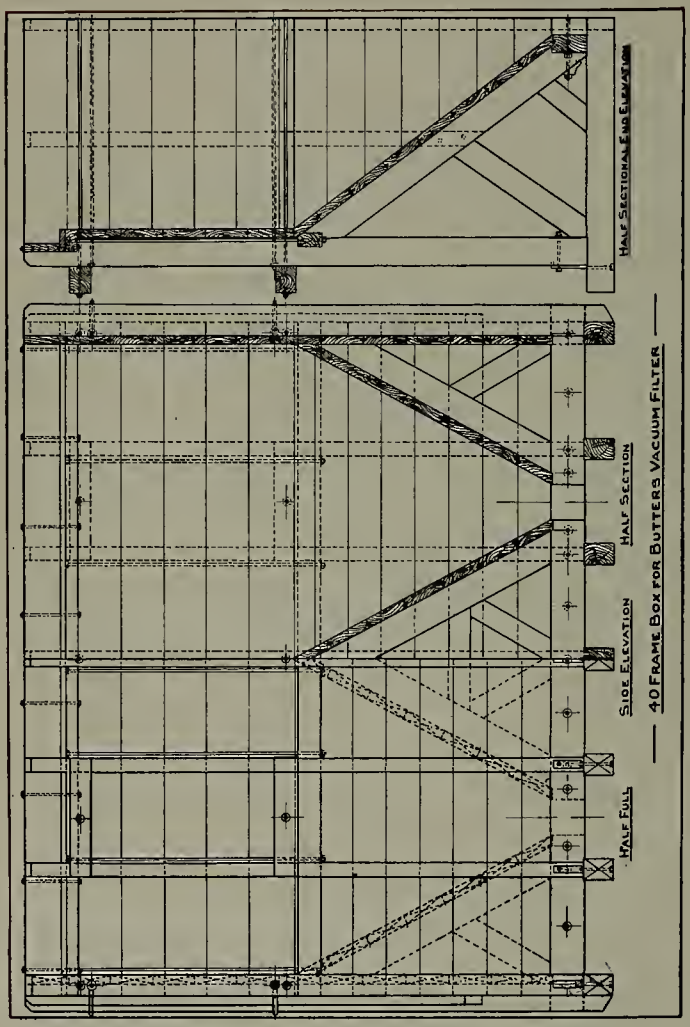


Illustration of Filter Tank

filter frames, depending in number upon the capacity desired, a containing box and a system of pulp, water solution and vacuum pumps, with vats, pipes and valves, which may be arranged in any one of the different systems, i e —gravity, semi-gravity or pumping; the semi-gravity being the preferred system.

The pumping system is especially adapted to flat sites, where the treatment stock tanks, filter boxes and precipitation, may be on one level.

The gravity system is best where electric power is bought at peak load rating, as the pumps are smaller. However, the total power consumed will be about the same for either system.

There are many improved features, such as special fittings, valves, etc., that greatly add to the simplicity of operation, and reduces power consumed. All the appliances are manufactured by the Butters Patent Vacuum Filter Company, and furnished to users of filter leaves at cost. Complete plans and working details, designed to suit local conditions are furnished, thus insuring the most economic installation and operation, as well as the highest possible efficiency.

We can show interested parties a complete Semi-Gravity Butters Patent Vacuum Plant in operation in San Francisco.

We List Below Some of the Companies Using the Butters Patent Vacuum Filter

No. of Frames	Company	Address
200	Chas. Butters & Co., Lt.	Virginia City, Nev.
100	Butters Copala Mines	Copala, Sinaloa, Mex.
62	Combination Mines Co.	Goldfield, Nev.
196	Tonopah Mining Co. of Nevada	Millers, Nev.
20	Tonopah Mining Co. of Nevada	Tonopah, Nev.
20	Nevada Goldfield Reduction Co.	Goldfield, Nev.
40	Guadalupe Mine	Inde, Durango, Mex.
32	Haciendas de San Francisco	Pachuca, Mex.
105	Montgomery-Shoshone Consd. Co.	Beatty, Nev.
85	Butters Divisadero Co. Inc.	Divisadero, Salvador, C. America.
100	Butters Salvador Mines, Ltd.	San Sebastian, Salvador, C. Amer.
85	Creston Colorado Co.	Minas Prictas, Sonora, Mex.
130	Black Mountain Mining Co.	Cerro Prieto, Sonora, Mex.
90	Ventanas Con. Min. & Milling Co.	Ventanas, Durango, Mex.
144	Montana-Tonopah Min. Co.	Tonopah, Nev.
120	Tonopah-Belmont Developm't Co.	Millers, Nev.
30	South American Development Co.	Zaruma, Ecuador
65	Dolores Mines Co.	Dolores, Chihuahua, Mex.
66	N. Y. & Honduras Rosario M. Co.	San Jancito, Honduras, C. Amer.
80	Pinguico Mines Co.	Guanajuato, Mex.
60	Mexican Milling & Transport'n Co.	Guanajuato, Mex.
80	Inde Consolidated Gold Min. Co.	Inde, Durango, Mex.
40	Palmarejo & Mex. Goldfields, Ltd.	Chinapas, Chihuahua, Mex.
40	Homestake-King Mining Co.	Rhyolite, Nev.
40	Manhattan Ore Red'n & Refin'g Co.	Manhattan, Nev.
20	The Oxnam Prospecting Co., Ltd.	Guazapares, Chihuahua, Mex.
75	Guanajuato Red'n & Mines Co.	Guanajuato, Gto., Mex.
72	Joe Dandy Mining Co.	Cripple Creek, Colo.
206	Cia de Real del Monte y Pachuca	Pachuca, Mex.
52	Virginia & Mex. M. & Smelt. Corp.	Hostotipaquillo, Jausco, Mex.
25	Compana Minera La Republica	La Republica del Sauz, Chih., Mex.
96	Florence Goldfield Mining Co.	Goldfield, Nev.

Hypo-Sulphite Plants

The treatment of silver ores by Hypo-Sulphite solution is, with some variation, the principal process in use for the extraction of silver values, and the specifications for such plant call for Tanks of a size and shape similar to those used for the Cyanide Process, with the exception that the silver is precipitated in Circular Precipitation Tanks instead of Zinc Boxes, and sufficient tankage must be provided to keep the different solutions, as wash water, weak solution or strong solutions separate. The necessary tankage consists of

Lixiviation Tanks
Precipitating Tanks
Storage Tanks for Precipitates
Solution and Sump Tanks
Precipitating Tanks for Wash Water
Sodium Sulphite Tanks

The following process has been recommended by A. R. Partridge, Mining and Metallurgical Engineer:

Hypo-Sulphite Leaching

IT HAS been the usual practice where gold is contained in the silver bearing ores in considerable quantities, and in an arseno-pyrite especially, and where salt is cheap, to use as high as 12% of this chemical. There is a double advantage to be gained by doing this—the extractions will be high in gold as well as silver, and the resulting sulphides will be much cleaner and of higher grade.

As a general rule it is a mistake to crush ore finer than to a No. 26 mesh, which should be done dry if possible. The silver will be just as easily chloridized and the vat filtration greatly increased.

The secret of good leaching rests in the roasting or chloridizing of the ore, the balance is mechanical.

The best results have been attained with hand roasters. In constructing a roasting furnace, it is essential to observe proper proportions of grate area and area of rabbling doors to that of the flue. If these conditions are correct, and green wood is used as fuel, the losses by volatilization will be small.

The best time to add the salt during the roasting operation depends on the ore entirely. Give the ore a comparatively short roast and place in a heap as soon as it is drawn from the furnace. These heaps should be of a size equivalent to the capacity of one vat, or to the amount of ore roasted in 24 hours.

The heaps should be allowed to cool naturally for from 5 to 14 days, according to the size of the heaps, and when thoroughly cool, a little water should be sprinkled and the ore loaded into vats.

Few superintendents of works realize the importance of cooling the ore in this manner. Chlorination continues steadily throughout the heap until cold; also, the ore becomes very spongy and enables the filtration to take place rapidly as well as more thoroughly, and there is less loss by rich solution remaining in the ore after the final wash water is applied.

When a vat is ready for receiving its charge, the duck filter bottom should be well rinsed in clear water and set in position. The outlet cocks should be closed and the vat filled one-quarter of its depth with clean water, and the unleached ore charged in the vat to within 8″ or 10″ of the top. If the ore contains many bases and it is charged dry in the vats, the filter bottom is liable to fill with crystallized salts and impair a free filtration during the leaching process.

Fresh water is now run into the vat from the top (and preferably from a series of holes which are made in the Patent Non-Shrinking Tanks), the outlet cocks turned on, and the resulting liquid run into the base sulphide precipitating tanks.

Generally the first 1500 gallons of wash water will contain all the silver that will be dissolved in the wash water. The balance of the water is run to waste until there is no sign of precipitation whatever. When this takes place, the water is shut off, and the hypo solution to the strength of 1.8% Beaume allowed to run continuously over the ore and the silver precipitated in the silver precipitating vats.

If the process is carried on as above, it will take about 30 hours to treat a large vat of ore, and the extractions should average 93% of the silver contained in the ore, and 36% of the gold.

If the tailings contain any appreciable quantity of gold, and it will still pay to extract it, a weak solution of cyanide will do it effectively and without any necessity of removing the tailings from the vat. All that is necessary is to give the tailings an extra long wash after the silver leaching has been concluded. The cyanide solution is precipitated in zinc boxes in the usual manner.

Use as a precipitant one part of caustic soda to two of sulphur. This article gives a much clearer and richer sulphide, and is more easily prepared, and if the wash water is properly gauged, it will maintain the strength of the hypo solution. When once the stock solution has been made to standard, hypo-sulphite of soda is not necessary.

In adopting the above described method the precipitating vat capacity has to be large, but, on the other hand, the ore vats need not be so numerous, and on the whole will be more economical both in first cost of plant, as well as in the actual operation.

General Specifications

2 Solution Tanks
6 Leaching Tanks, with False Bottoms, Filter Cloth and Discharge Doors
6 Precipitating Tanks, with Special All-Wood Agitator, operated by overhead gearing
1 Pressure Tank
1 Filter Press
1 Air Compressor, Wood Launders to connect the different Vats
1 Sump Tank
1 Solution Pump
Special Stop Cocks, Rubber Hose for Special Connections, Pipe and Fittings

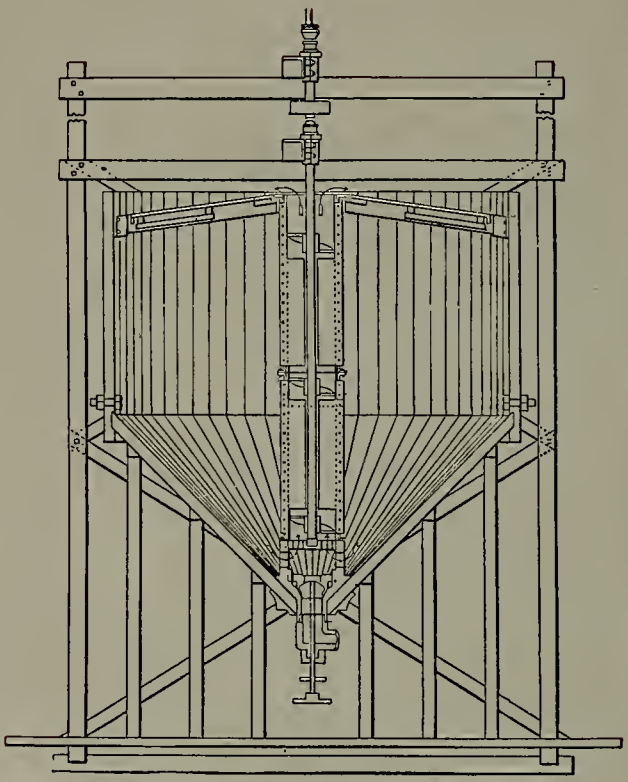
When silver ores carry an appreciable amount of gold values, it is often advisable to give such ores a cyanide treatment after the silver has been extracted by hypo-sulphite; this second leaching can be done in the same leaching tanks without rehandling of the ore, and the following items would be required in addition to above specifications:

2 Solution Tanks
2 Gold Solution Tanks
3 Zinc Precipitation Boxes
2 Extra Sump Tanks
1 Cyanide Solution Pump
Black Iron Pipe and Connections for conveying Cyanide Solution
Acid-Proof Cyanide Paint
Patent Zinc Lathe
1 Vacuum Clean-up Tank and such other appliances as may be required for the preparation of the precipitates.

Upon request we shall be pleased to furnish specifications and quote prices on plants of any desired capacity.

Code Name, NOCTAM

Agitation



HENDRYX AGITATOR.

For description, sizes and prices, see page 87.

The Hendryx Agitator

THE AGITATOR is designed for the rapid extraction of gold and silver from unseparated sand and slime by means of agitation and aeration in weak chemical solutions containing cyanide. The essential mechanical feature of the agitator consists of a cylinrical tank having a conical bottom. In the center of the tank is a circular well which extends nearly to the top and bottom, supported by braces from the side of the tank, and having a circular apron at the top, which slopes gradually towards the circumference and permits the ore pulp solution, in flowing over it, to be spread out into a thin sheet and to absorb an abundance of free oxygen. In this well is a hollow shaft carrying a driving pulley near the top and a number of screw propellors or pulp solution lifting wings. The discharge valve is connected to a screw for opening and closing. A coil of pipe serves for raising the temperature of the charge by means of steam or hot water passing through it. The revolutions of the propellors in the well produce a strong upward current, thus resulting in a rapid and uniform circulation of the pulp upward to an aerating apron, where it spreads out into a thin sheet, losing its velocity and gently falling from the edge of the apron into the great mass of the ore pulp solution, where its velocity is again reduced, and then gently dropped down to the bottom of the agitator.

The power required to operate a machine holding a charge of 110 tons of ore pulp, containing two tons of solution to one of ore, is five horse-power, and the whole contents of the tank are brought up and over the aerating or distributing apron once in five or ten minutes, depending on the speed of the pump.

The agitator is built in three sizes, designated as 8-foot, with a capacity of six tons of ore to the charge; 12-foot, with a capacity of seventeen tons of ore to the charge; and 17-foot, with a capacity of thirty-five tons of ore to the charge; and they treat from two to eight charges in twenty-four hours. These figures are based on ores of average character.

Diameter of Tank, Feet	Capacity, Tons	Shipping Weight	List Price	Code Name
8' tank and agitator	6	7500 lbs.	$1250.00	Noctif
12' tank and agitator	17	12000 "	3000.00	Noctua
17' tank and agitator	35	23500 "	4000.00	Nodalt

The above prices do not include foundation or bridge tree material.

Copper Leaching Processes

MOST RECENT DEVELOPMENTS IN COPPER LEACHING

OF THE many leaching processes developed and proposed for the economical extraction of Copper from Carbonate, Oxide and Silicate ores, when reduced to their simplest terms, involves the use of either a copper solvent acid such as Sulphuric Acid (Oil of Vitriol, H_2SO_4), the one mainly used, as well as that of Hydrochloric (Muriatic Acid) and Sulphurous Acid (SO_2) for Siliceous ores, and ores devoid of great quantity of acid-consuming minerals, which are: Lime, Magnesia, Alumina and Iron Oxides or Carbonates. For ores with gangues of the latter type, Ammonia and its compounds is the more economical solvent to be recommended.

To make a financial and economical success of the acid leaching processes in treating oxidized copper ores, implies in most cases the erection of an acid works at the mill and local manufacture at the lowest possible cost of the acid required, such as Sulphuric Acid, for instance, direct from a cheap source of Sulphur or Pyrites. The buying of acid at commercial centers and freighting to the mine and mill usually proves expensive and ends in failure from a money making point of view.

To construct and install Acid Works at a Copper Leaching Plant requires an outlay of large sums of money, but it can be depended on and will be quickly repaid through the very cheap cost of the acid produced.

The strength of acid solution usually to be applied cold is from 3% to 5% (H_2SO_4). Hot solutions, while giving a more thorough and faster copper extraction, quite often result in excessive and costly acid consumption per ton of ore treated.

Sulphide copper ores will, after roasting with or without salt, give very nice extractions with plain water leaching, and in but few instances demand a slight addition of acid from an outside source; in other words, will not require the building of Acid Works at the Mill.

PRECIPITATION

The usual precipitant for copper out of acid solutions is iron in the form of either scrap, billets or rails. With compressed air agitation and careful work, the iron consumption ought not to be over 1½ to 2 pounds iron for each pound cement copper obtained.

Electrical precipitation requires 70 to 125 H. P. per 24 hours per ton (2000 lbs.) copper produced, is costly to install and requires great skill to operate.

Sulphurous precipitation is effected by saturating the copper solution with sulphur gas (SO_2) and heating under pressure in boilers lined with acid-proof linings similar in method to that used in wood pulp manufacture.

The last two methods of precipitation (Electrical and Sulphurous) are to be applied where iron is too expensive and electric power or sulphur material cheap.

Bluestone or Copper Sulphate—In many cases it is possible to boil down the leached copper solution to the crystallizing point, 32° to 35° Bé, and manufacture Bluestone at the mill at nominal cost. Copper Sulphate always brings a better price than any other copper mill product. The manufacture of Copper Sulphate ($Cu\,SO_4\,5\,H_2\,O$) entirely overcomes the use of any required precipitant for the copper. As the extraction of copper from the ore by means of acid solutions, is usually complete in a few hours, the leaching or agitating capacity of a copper leaching plant is several times greater than that of a Cyanide system.

A typical copper leaching ore with acid solutions is a copper carbonate (Azurite, Malachite) in Sandstone gangue. Sandstone ores with a mixture of copper carbonates and glance (Cu_2S), Cuprous Sulphide or Chalcocite must first be roasted to give a satisfactory copper extraction on leaching with Sulphuric Acid.

Where the ores on account of presence of much lime ($CaCo_3$) will, with Sulphuric Acid solutions in leaching, pack, cement and behave badly. It will be advisable to apply Muriatic Acid instead. The Muriatic Acid is also to be manufactured on the mill property and is to be preferred for the above reasons on account of forming very soluble compounds with the Lime Minerals. Electrical precipitation can be more con-

fidently applied to Copper Chloride solutions than to Sulphate, where this form of extracting the metallic copper is preferred to that of iron precipitation, making it possible to use graphitized Carbon Anodes, which are entirely unsuited to Sulphate solution and for which Lead Anodes must be used instead.

Approximate cost of Sulphuric Acid Works complete are:

For an output of 3 tons 66 Bé (93% H_2SO_4) or its equivalent in 50° Bé (62% H_2SO_4) per 24 hours.

LEAD CHAMBER SYSTEM

Sulphur Burning Plant	$ 7,500.00 to	$10,000.00
Pyrites Burning Plant	10,000.00 to	15,000.00
Cost of producing Sulphuric Acid 66° Bé ranging between	3.00 to	4.00

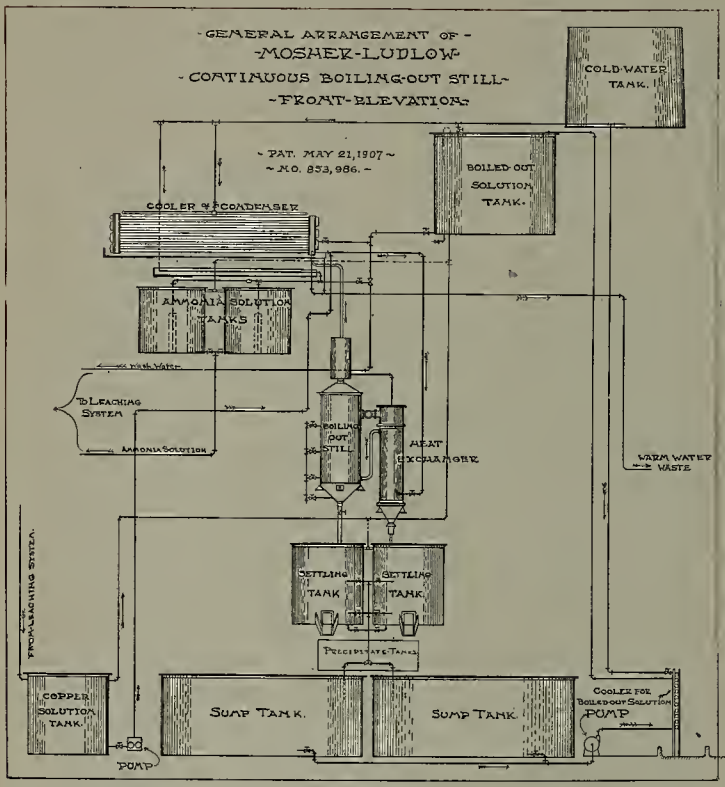
per ton, without figuring in the cost of the Sulphur or Pyrites material required.

If 100 pounds Acid 66° Bé consumed per ton of ore treated, the above daily output of the Acid Works (3 tons 66 Bé) will be sufficient for a 50 to 60 tons (24 hours) Copper Leaching Plant.

View of North Star Mine

Pneumatic agitation and electrical precipitation as used at the North Star Mine, Grass Valley, Cal. Electrical conductors can be seen on each agitator

The Mosher-Ludlow Still



Code Name, NODOSI

Parties making inquiries can be referred to the patentees for full information.

The Ammonia-Cyanide Process

IS INTENDED for the treatment of copper, nickel and zinc ores with gold and silver values and for leaching tailings containing copper, as well as gold or silver, or both.

This process is a further development in the use of Ammonia as a solvent for the extraction of Ammonia soluble metals from ores and tailings. In this process KCN is added to the Ammonia solution to combine both the gold and silver extraction with the copper. In many instances a preliminary leaching with dilute Ammonia to remove as much of the copper as possible, followed by weaker Ammonia Cyanide, may prove of great advantage on account of permitting a better concentration of the gold and silver values in the subsequent gold and silver precipitates produced.

The principle involved in the process is that by adding KCN to Ammonia in the presence of copper, Cupric Cyanide ($Cu\,CN_2$), with an excess of Copper Hydroxide ($Cu\,HO_2$), is formed in the Ammonia solution.

Such a solution is very stable and has important oxidizing qualities, as it rapidly withdraws oxygen from the atmosphere, which, as is well known, is of great value in ordinary Cyaniding. An Ammonia-Cupric Cyanide solution has gold and silver solvent power equal to or greater than ordinary KCN, and can be used on ores and tailings free from copper where the Cyanide consumption has been due to Ferrous or other reducing salts.

The Ammonia-Cyanide solution is generally prepared by dissolving 1 to 4 lbs. KCN in a ton of solution containing 1% NH_3 for every 1% copper present in the ore or tailings. In ordinary leaching tanks a stronger Ammonia solution than 1% cannot be recommended. The plant in most cases can be of simple construction similar to regular Cyanide Plants, but the precipitation of the values differs greatly from Cyanide practices, since the copper is precipitated in specially constructed stills.

A modification of the Ammonia-Cyanide Process can be used for treating Sulphide silver ores raw, thereby avoiding the expense and installation required in roasting of same.

The Mosher-Ludlow Still

was designed as the simplest and least expensive method in recovering metals, such as copper, zinc or nickel in the Ammonia and Ammonia-Cyanide Processes.

The still admits of a continuous boiling out arrangement whereby a precipitate is recovered of high percentage in copper at very low cost and small steam consumption.

The advantage of continuous over intermittent boiling and precipitation is well understood and does not require detailed explanation.

This still fully utilizes the heat units of the waste hot boiled out solution and forms an Ammonia tight apparatus.

A heat interchanger and cooling coil is included in the still and the system requires an ammonia absorption tank, a storage tank, leaching tanks, sump tank, and a settling tank for precipitates, etc.

As will be seen from the illustration, the object is to use a still of small dimensions but proportional large capacity and minimum operating expense.

The heat interchanger extracts the heat from the outgoing boiled out solution, which it imparts to the ingoing Ammonia solution.

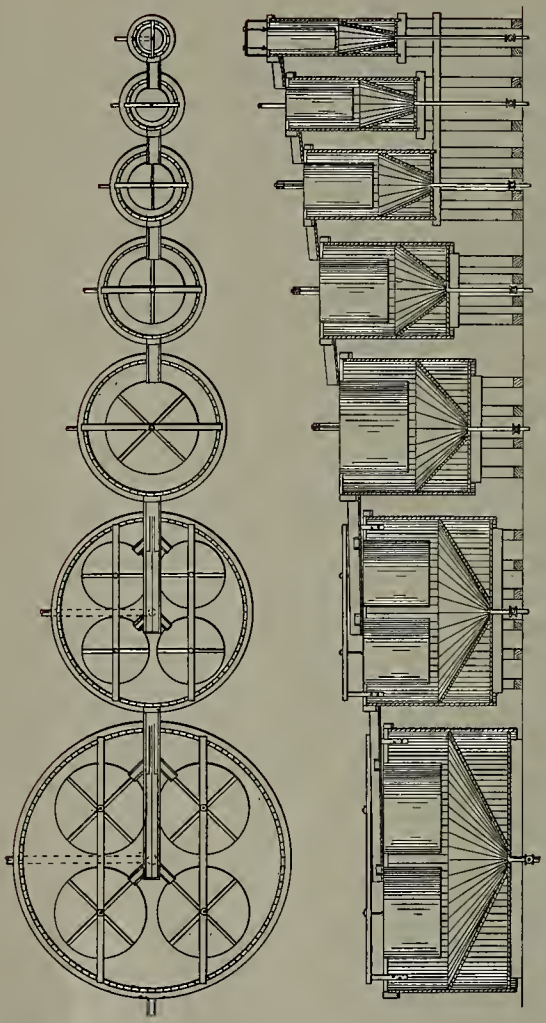
The cost of boiling solution, precipitating metals as oxide and recovery of Ammonia should not exceed $0.10 per ton of solution, figuring coal at $6.00 per ton or oil or wood at corresponding prices.

The cost of attendance and repairs is figured at $0.10 per ton additional, making a total of $0.20 per ton.

A still of 4′ diameter and 10′ in height is estimated to boil out the solution from 100 tons of ore in 24 hours.

Further data furnished upon request.

Sherman Classifying Tanks



Code Name, NODULE

A Set of Sherman Classifying Tanks, Followed by a System of Fine-Ore Settling and De-watering Tanks

THE accompanying cut shows a combined system of Sherman Classifying and De-watering Tanks.

High up in the front ranks of the useful inventions that have contributed to the saving of the precious metal, will always be recognized the Sherman System of Concentration.

One of the very important features of this system is the thorough manner in which the pulp is classified and freed from an excess of water so that the various sized products are delivered each to its respective concentrating table with just the proper amount of water so that the best results in working can be secured.

It is a well-known fact that when properly classified material is delivered to a concentrating table for working, that the capacity and efficiency of the table is greatly increased, over any work possible on an unclassified product.

The System of Fine-ore Settling and De-watering Tanks deals with that class of material, which is the undersize of a 200-mesh screen generally termed slime. By means of this system all the fine ore or slime is settled and de-watered, thence delivered to slime table under best possible conditions for successful working. The system partially shown in cut requires four slime tables for the proper treatment of the settled and de-watered material from these sixteen tanks.

The overflow water from this system of tanks is clear and can be used as wash water on the concentrating tables or for any other purpose about the mill.

Some of the advantages of this combined System of Classification and Settling are as follows:

FIRST—It is automatic in its working.

Once the product is delivered to the first classifying tank of the series, no machinery or power is needed. Once properly adjusted, the system requires but little attention.

SECOND—No wearing parts except the regulating plug, which is easily and cheaply replaced. Sets of these tanks are in operation that have treated 500,000 tons of ore and are in every respect as good today as when they were installed, the cost for maintenance being virtually nothing.

THIRD—Large capacity and cheap cost of installation.

FOURTH—A clean-cut separation of the various sized products, these being properly de-watered, thus enabling a concentrating table to produce best results in treatment of same.

FIFTH—Working in connection with a Fine-ore Concentrating Table, a high saving of the very fine values can be effected, thus saving by water concentration any values that will in from three to five minutes of time settle in still water.

SIXTH—Where economy of water is a consideration, it is possible to treat a ton of ore and not use more than 1000 lbs. or 1500 lbs. of water. The combined system offers many advantages in the treatment of gold ores by amalgamation, concentration and cyanidation.

The classified material from each tank is drawn first to its respective amalgamation plate, thence from the amalgamation plate, as it passes to a concentrating table, thence on to the leaching vats for cyanide treatment. The classified material being freed from slime, plate amalgamation makes a much higher recovery of the free gold.

After concentration the various classes of material can be kept separately as desired, even to the extent of keeping each of the seven classes by itself; thus the sand can be sent to the leaching vats in any manner that is most advantageous and the slime kept by itself for separate treatment by agitation.

The process is in every respect ideal for the combined treatment of gold ores.

Set of Sherman Classifying Tanks. See pages 92-93

Directions for Setting up Tanks

The weight of a tank and its contents should rest entirely upon the tank bottom, placed on chime joists of proper dimensions so that the bottom end of the staves will be no less than one inch from ground or platform. (Never, under any circumstances, let the tank rest upon the staves; the bottom must carry the total weight of tank and contents.)

1. First lay the foundation of chime joists of at least 3 x 4 set edgewise, 18" apart, cut just long enough so that the chime or end of staves after being driven in place will clear ends of joists one inch. See that the chime joists are of even size and level so that the weight of the tank is equally divided.

2. All dowels are cut to length and shipped in a separate box.

3. Lay the bottom with edges close together and tack a cleat across the same to hold it in place while driving on the staves.

4. Commence setting up staves at the end of longest piece of bottom. DRIVE ON STAVES ONLY TWO-THIRDS THE DEPTH OF THE CROZE, and see to it that the staves fit snugly edge to edge.

5. If the last stave should be too wide to fill the opening, it should be ripped and the edge jointed to the bevel, so as to make a snug fit.

6. When the staves are all in place, put a rope around the tank and twist it up close.

ROUND HOOPS

7. If the tank is fitted with round hoops, decide first how many sections belong to each hoop. (This information is usually given a customer at the time shipment is made.) If some hoops are of larger diameter than others (for instance, if some are ⅝" and others ½" diameter), the stronger hoops are to be used on the bottom of the tank at the point of greatest pressure. Place the bottom hoop slightly below the center of the croze, the next hoop about 2" above, then gradually increase the space between the hoops until the top of the staves is reached. Two-thirds of the hoops should be placed on the lower half of the tank and no hoops spaced over 18" apart. Tanks fitted with round hoops are always made with straight sides. A few of the staves of each tank are marked showing where the hoops are to be placed. Where round hoops are used, it is advisable to seat the bottom hoop slightly into the wood. This can be done with a heavy hammer at the same time you are trueing up the staves and driving them into position.

FLAT HOOPS

Put on hoops beginning with bottom hoop No. 1, which should set directly over the croze. Avoid making one hoop draw the tank tight, but drive all as equally as possible, each in turn reasonably tight until all are on, then gradually drive them until they are in position, which should be nearly equal distances apart. The top hoop has a screw lug and does not need driving. Place this as near as possible to top of staves and screw up the lug.

8. When the hoops are partly tight, true the staves into position, using a block of wood and a heavy hammer. Never allow the hammer to strike the staves.

9. Run the main discharge pipe from the pump over the top of staves into tank. Fit the patent cup (which is furnished with each patent tank) in the groove directly under the discharge pipe. Put a "T" in pipe over cup with ¼" or ½" nipple into cup to supply water to the groove in staves.

10. The patent cup should not be driven into the groove at the top of the staves. If there is not sufficient width, trim the groove with a knife or chisel to fit the cup. (Driving will split the staves.)

11. If the above instructions are carefully followed out, the tank will be water tight, but should the tank leak a trifle when the water is first turned in, it will soon swell the wood and remain water tight.

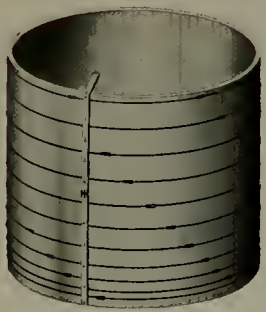
Where a PLAIN TANK is to be set up, use the same directions, except rules 9 and 10, which apply only to patent non-shrinking water tanks.

THE SETTING UP OF A TANK is a very simple matter providing the above directions are complied with, but we sometimes find that not sufficient attention is paid to rule 4, and staves are driven on the full depth of the croze, instead of only two-thirds the depth, the result is the tank leaks in the staves because there is not sufficient staves used. The importance of rule No. 4 must not be overlooked, because by only driving the staves two-thirds the depth of croze, we obtain a larger circumference than the bottom calls for and this enables us to tighten the staves edge to edge, and make water-tight joints, while if the staves are driven full on the croze, they cannot be made water-tight when the hoops are drawn or driven to place.

Every section of each tank bottom is lettered and numbered, and when more than one tank is shipped at a time, the staves for each tank are lettered the same as the tank bottom to which they belong.

Considering that tank lumber more than 20′ long costs greatly in excess of 20′ lumber, it is an established rule to butt-joint all tank bottoms above 20′ in diameter. On all bottoms where butt-joints are made, the ends are match marked. This indicates at a glance which bottom planks are to be used end to end in making this butt-joint.

Plain tanks should be filled with water immediately after completion, but if this cannot be done and the tank stands empty for several days, the hoops should be tightened every day until ready to be filled. No matter how dry the lumber is when it leaves the factory, it will shrink some when exposed to the wind and sun. Patent tanks only need not be kept full of water all the time to prevent shrinking, but if a few inches of water is kept in the tank to cover the bottom, and the patent groove is kept filled with water, the tank will not dry out.



Plain Tank

Plain and Patent Water Tanks

Plain tanks do not have a water channel at top of staves, but are provided with register.

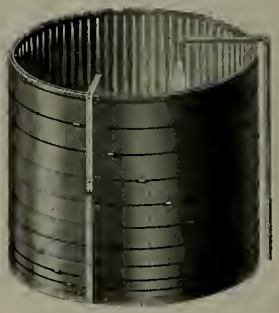
PRICE LIST

Fitted with round, soft steel hoops and straight-pull malleable iron lugs

Capacity Gallons	Diam. Ft. In.	Height Feet	Approximate Weight	Thickness Inches	List Price	Code Name
500	5′ 1″	4′	446	2″	$ 26.00	Noemat
800	6′	5′	642	2″	33.00	Noetil
1000	6′ 6″	5′	729	2″	38.00	Noianc
1500	8′	5′	933	2″	49.00	Noious
2000	8′	6′	1065	2″	55.00	Noiset
2500	8′	7′	1196	2″	64.00	Nolite
3000	9′	7′	1346	2″	69.00	Nolety
4000	9′	9′	1641	2″	85.00	Nomadr
5000	10′	9′	1855	2″	97.00	Nonacq
6000	12′	8′	2126	2″	108.00	Nonage
7000	12′	9′	2323	2″	120.00	Nonari
8000	12′	10′	2520	2″	132.00	Noncha
10000	13′ 8″	10′	2963	2″	158.00	Nonrse
10000	13′ 8″	10′	4249	3″	213.00	Nology
12000	14′	12′	6205	3″	244.00	Nopalr
15000	16′	12′	7272	3″	290.00	Noscit
20000	18′	12′	8456	3″	338.00	Noseba
25000	18′	14′	9564	3″	390.00	Nosgay
30000	20′	14′	11002	3″	460.00	Nosogr
40000	23′	14′	13467	3″	538.00	Notano
50000	24′	16′	15798	3″	625.00	Nouedy
60000	26′	16′	17655	3″	705.00	Nouris
75000	29′	16′	20573	3″	810.00	Novacu
100000	30′	20′	26211	3″	1085.00	Nowize

All measurements of diameters and heights are outside measure.

Prices in this catalog are for tanks K. D. ready to set up, and do not include frames, covers or foundations.



Patent Tank

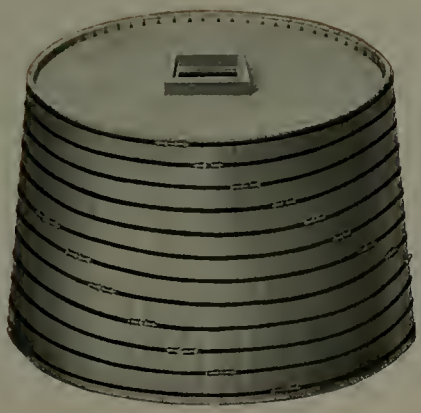
The Patent Non-Shrinking Water Tank is provided with a water channel at top of staves, which, when partly full, allows the surplus water to flow into the tank through overflow holes.

The above list covers both patent and plain Tanks, as illustrated.

Oil Tanks

Patent Non-shrinking

These Tanks are fitted with 2-inch drum head and curbed man-hole



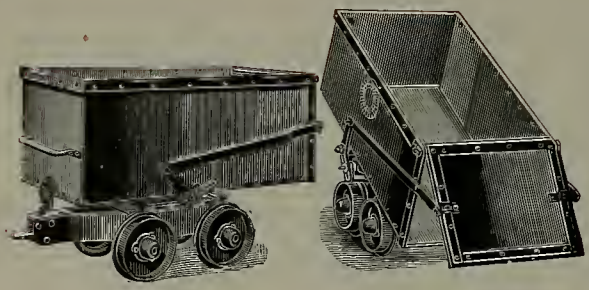
Capacity Barrels	Diam. Ft. In.	Height Feet	Approximate Weight	Thickness, In.	List Price	Code Name
100	10′ 6″	8	3810	3	$ 155.00	Noxios
125	11′	9	4408	3	180.00	Noyand
150	12′	9	4914	3	199.00	Nozlex
200	13′	10	5857	3	237.00	Nubing
300	16′	10	7874	3	314.00	Nubfer
400	16′ 9″	12	9461	3	381.00	Nubila
500	18′ 6″	12	10805	3	434.00	Nucame
600	21′	12	12885	3	511.00	Nucifr
800	21′ 6″	14	14744	3	587.00	Nucleo
1000	24′	14	17311	3	695.00	Nudgem
1200	25′	16	20037	3	813.00	Nuisan
1500	27′ 6″	16	22850	3	930.00	Nulaph
2000	32′	16	29156	3	1198.00	Nunchi

Write for discounts

For prices on plain oil tanks, see lists for water or solution tanks.

Tanks furnished from our Puget Sound Factory are manufactured from Washington Fir. Our San Francisco and Los Angeles Factories make a specialty of Redwood Tanks, but are prepared to furnish Fir Tanks when requested.

Standard Truax Ore Cars



Specifications

Number of Car	Width of Body Inches	Length of Body Inches	Height of Body Inches	Total Height from Top of Track. Inches	Capacity Cubic Feet	Shipping Weight Pounds	Thickness of Steel in Sides Number	Thickness of Steel in Bottom Number	List Price	Code Name
14A	24	44	21	35	13	460	12	8	$50.00	Nuncia
14B	24	44	21	35	13	470	12	1/8	51.00	Nuphar
14C	24	44	21	35	13	515	10	1/4	55.00	Nupson
14D	24	44	21	35	13	555	1/8	1/4	57.00	Nurten
17A	24	48	24	38	16	510	12	1/8	57.00	Nutant
17B	24	48	24	38	16	565	10	1/4	66.00	Nutbon
17C	24	48	24	38	16	650	1/8	1/4	72.00	Nutria
20A	24	44	24	38	14½	525	10	1/8	59.00	Nuxvom
20B	24	44	24	38	14½	550	10	1/4	61.00	Nuzlen
20C	24	44	24	38	14½	600	1/8	1/4	66.00	Nyaste
20D	24	44	24	38	14½	650	1/4	1/4	72.00	Nylgau
19A	30	54	24	41	22½	750	10	1/8	74.00	Nympht
19B	30	54	24	41	22½	780	10	1/4	76.00	Nyself
19C	30	54	24	41	22½	835	1/8	1/4	79.00	Nysute
19D	30	54	24	41	22½	885	1/4	1/4	89.00	Nysant
21A	30	54	30	47	27	800	10	1/4	80.00	Nysquo
21B	30	54	30	47	27	875	1/8	1/4	89.00	Nyzore
Light Ton Car	30	48	24	41	20	720	10	1/4	73.00	Nyzifo
Heavy Ton Car	30	48	24	41	20	770	3/16	1/4	80.00	Nyzpha

Prices F. O. B. San Francisco, Cal.

NOTE—In ordering cars for cages, give us exact length and width of cage. Cage cars are usually built with the step under the body of the car. Unless otherwise specified, all cars are built for 18-inch gauge of track, but any gauge will be built to order.

Prices on side dump cars quoted on application.

Refer to page 107 for useful information.

Bullion Furnaces

No. 14	Height	Width	Length
Interior	23″	19″	19″
Exterior	26″	25″	34″

Complete Bullion Outfit Consists of

Description	Shipping Weight	List Price	Code Name
1 No. 14 Bullion Furnace, shown above..	675 lbs.	$60.00	Oafish
1 2¼″ Cary Gasoline Burner (2 needed)	10 "	18.00	Oaflot
1 No. 106 Storage Tank, with Pump, Pressure Gauge and Fittings complete	140 "	36.00	Oagtlo
1 18″ Dia. x 17½″ Deep I. M. Iron Bullion Mold	250 "	25.00	Oagsip
1 Pr. Basket Tongs (see next page)			
Complete Outfit listed above, with Tongs for No. 125 Crucible	1085 "	181.00	Oagouz

Crucible Furnace

With 24″x 24″ Grate Area

Will take Crucibles up to and including No. 125

Description	Shipping Weight	List Price	Code Name
Complete Iron Work (only)	900 lbs.	$75.00	Oaguno

Where fire-brick can be procured for a reasonable price, a very satisfactory furnace can be constructed by using our complete set of iron work (listed above), which consists of cover plates, grate bars, rods and trusses.

Basket Tongs

For Crucibles

For No. 60 to 100 Crucible..$10.00 Wt., 40 lbs. Code Name, Oakapl
" " 125 Crucible ..... 24.00 " 50 " " " Oareid

Overhead Trolley and Chain Block

For Crucible Furnace

Weight, 150 lbs. Price, $40.00 Code Name, Oarfot

Black Lead Crucibles

Nos.	Height Outside	Diameter at Top Outside	Diameter at Bilge, Outside	Diameter at Bottom, Outside	Code Name
20	10¼"	7⅞"	8⅜"	6"	Oarsma
25	10¼"	8"	8½"	6"	Oasise
30	11¼"	8⅝"	9¼"	6⅝"	Oatcak
35	11⅝"	9¼"	9¾"	7"	Oathab
40	12⅜"	9¼"	10¼"	7½"	Oatmal
45	13"	9¾"	10½"	7½"	Obambu
50	13⅜"	10⅛"	11⅜"	8"	Obdorm
60	14"	10½"	11⅝"	8"	Obduce
70	14⅝"	10¾"	12"	8¼"	Obdura
80	15⅛"	11¼"	12⅜"	8½"	Obeahm
90	15¾"	11⅜"	12½"	8⅞"	Obelis
100	16⅛"	11⅞"	13⅛"	9¼"	Obequi
125	16½"	12½"	13¾"	9½"	Obitar

Price, 10c per No.

Cast Iron Drying Pans

For Cyanide Slimes

Size	Weight	Price	Code Name
24"x 18"x 6"	95 lbs.	$10.00	Objelf
24"x 24"x 6"	130 "	12.00	Oblect

Standard Wrought Iron Pipe

	Nominal Size Inside Diameter	Price per foot, Black	Nominal Weight per Foot	Actual Outside Diameter	Code Name
Butt Welded	⅛"	Upon Application	.241 lbs.	.405"	Octaro
	¼"		.420 "	.540"	Odeump
	⅜"		.559 "	.675"	Odical
	½"		.837 "	.840"	Odonto
	¾"		1.115 "	1.050"	Odoram
	1"		1.668 "	1.315"	Odylex
	1¼"		2.244 "	1.660"	Ofocio
Lap Welded	1½"		2.678 "	1.900"	Ofingl
	2"		3.609 "	2.375"	Ofward
	2½"		5.739 "	2.875"	Ogodat
	3"		7.536 "	3.500"	Ognati
	3½"		9.001 "	4.000"	Ogreis
	4"		10.665 "	4.500"	Ogynic
	4½"		12.490 "	5.000"	Oilclo
	5"		14.502 "	5.563"	Oilnot
	6"		18.762 "	6.625"	Oilsto
	8"		28.177 "	8.625"	Okrome
	10"		40.065 "	10.750"	Oldfas
	12"		48.985 "	12.750"	Oleast

Tank Connections

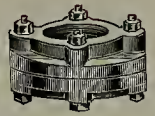
Size, inches	¾	1	1¼	1½	2	2½	3	4
Black, each	$0.75	$1.00	$1.25	$1.50	$2.00	$3.00	$4.50	$7.00
Code Name	Olfaer	Oliote	Olivac	Ologra	Omagre	Ombren	Omelet	Ominat

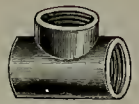
The above list is based on tank connections being 7" long, with a 4" thread on one end and standard thread on the other.

Pipe Fittings

CROSS

NIPPLE


FLANGE COUPLING


TEE

UNION

REDUCER

ELL

Size, Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Elbows, Malleable	$0.12	$0.12	$0.17	$0.17	$0.24	$0.40	$0.59	$0.83	$1.90	$3.00	$4.20	$5.40
Tees, Malleable	.13	.14	.22	.22	.29	.53	.70	1.00	2.15	3.25	4.50	6.00
Crosses, Malleable	.14	.20	.35	.50	.70	.82	1.00	1.60	3.20	4.10	6.10	8.20
Reducers, Malleable	.12	.21	.21	.23	.35	.41	.46	.76	1.33	2.00	2.55	3.25
Caps, Malleable	.06	.07	.11	.18	.23	.27	.33	.44	.88	1.20	1.55	2.40
Bushings, Malleable	.04	.04	.04	.05	.06	.07	.09	.14	.21	.30	.40	.50
Unions, Malleable	.18	.20	.22	.27	.33	.46	.58	.75	1.55	2.10	3.65	4.35
Locknuts, Malleable	.04	.05	.08	.17	.22	.30	.33	.44	.82			
Locknuts, Cast Iron									.27	.34	.47	.64
Couplings, Malleable	.07	.10	.14	.25	.30	.41	.47	.82				
Couplings, Wrought								.28	.40	.60	.80	1.00
Unions, Flanged, C. I.			.40	.46	.52	.64	.78	1.00	1.25	1.50	1.80	2.10
Nipples, Short	.04	.04	.05	.06	.08	.11	.13	.18	.39	.48	.75	.85
Nipples, Long	.06	.06	.07	.09	.13	.17	.20	.27	.59	.72	1.05	1.20

Extra long nipples charged for at manufacturer's list.

The above list is for plain black fittings

Cyanide Valves and Cocks

All Iron

Threaded for Iron Pipe

No. 1

Price

No. 2

Style	¾"	1"	1¼"	1½"	2"	2½"	3"	4"
No. 1.....	——	——	——	——	$10.00	$12.00	$15.00	$20.00
Code Name.. ..	——	——	——	——	Ominza	Ominqu	Ominsi	Ominto
No. 2.....	$1.05	$1.30	$1.60	$1.95	$2.70	$4.40	$6.75	$15.50
Code Name.....Omiste		Omnipa	Omnisc	Omphac	Onagre	Oncidi	Oncote	Oneiro

Stone Faucets

For Acid Tanks

Size	Style	Price	Code Name
1"	T Handle	$ 6.00	Onerop
1¼"	T Handle	8.00	Oneyar
1½"	T Handle	10.00	Onkite

Wooden Bottoms

For Iron Cyanide Tanks

Diameter	2" Lumber	Code Name	3" Lumber	Code Name
10′	$ 17.00	Onomat	$ 27.00	Operab
12′	26.00	Onstea	44.00	Ophicl
14′	36.00	Ontolo	55.00	Opiatf
16′	46.00	Onwart	70.00	Opinab
20′	72.00	Opacou	108.00	Opinfx
24′	104.00	Opaliz	174.00	Opltre
30′	160.00	Openbi	270.00	Oporic

The above bottoms are doweled, cut to circle and fitted with calking seam. Where iron tanks of light gauge have been used, it is often desirable to re-enforce the worn-out and leaky bottoms with wooden bottoms. We therefore list the above sizes, and are prepared to furnish prices on special sizes upon application.

All list prices in this catalog are subject to discount.

Malleable Iron Flat Hoop Lugs

Single Bolt Lug

Double Bolt Lug

Size of Lug, Inches	Size of Bolts, Inches	Weight, lbs.	List Price	Code Name
1½ single bolt	½ x 13	2	$0.40	Opidan
1¾ " "	½ x 13	2⅜	.50	Oposet
2 " "	⅝ x 14	3½	.60	Opugna
2½ " "	⅝ x 16	6¼	.80	Optica
3 " "	¾ x 18	7	1.00	Opuscu
3½ " "	⅞ x 18	10	1.50	Oracle
4 double bolt	¾ x 18	14	2.00	Oranga
4½ " "	¾ x 18	16	2.50	Oratio
5 " "	⅞ x 18	20	3.00	Orbedf
6 " "	⅞ x 20	26	3.50	Orbicu

Malleable Iron Straight Pull Lugs for Round Hoops

Size, Inches	Weight	List Price	Code Name
½	12 ozs.	$0.20	Orcher
⅝	17 "	.25	Orchad
¾	22 "	.35	Ordela
⅞	35 "	.50	Ordina

TESTIMONIAL

Pacific Tank Company, Merlin, Oregon, March 27, 1908.
San Francisco, Cal.

Gentlemen: Car No. 10904 O. R. N., with Cyanide Plant and equipment, arrived here on time and in good shape, and will say we have never seen anything put up and shipped in as good condition as this car of Cyanide equipment.

We are more than pleased the way the order was filled and expect to be in position to give you some additional business before long.

Yours very respectfully,
Gold Road Mining & Milling Company.

Open Water Heater

Patent Applied for

Open Water Heater, Condenser and Purifier

Code Name, ORICHA

Open Water Heater, Condenser and Purifier

Patent Applied for

N THE preceding page we give an illustration of our Water Heater, Condenser and Purifier. Users will find this arrangement much cheaper than the iron heater usually supplied. It has a greater capacity at a very much less cost. The water comes into the Heater from the water supply, automatically gauged by a valve which keeps the water line always at the same point. The inlet supply is at the top, which allows the water to fall on a circular plate or table, that spreads it out and precipitates it to a second shelf or platform; after passing over this, is allowed to run through holes to the bottom of the tank. The water is heated while descending, and comes in contact with the steam, which operation also condenses a certain amount of steam. Water heated while in suspension is also purified and precipitates a certain amount of mineral matter upon the tables and into the tank. It often happens that three or four inches of this mineral substance is taken from the tables or bottom of the tank. If this mineral matter is allowed to reach the boilers, it forms on the tubes as a scale.

The steam exhaust comes up through the tank, strikes a circular table above and escapes at the top, condensing to a certain extent by coming in contact with the incoming water and striking the upper surfaces and head of the tank. There is a flushing valve located near the bottom of the tank by which the water line can be raised about once a week to the top of the oil flushing funnels. This is done generally on Sunday, when the water is cool and the oil is floating on top. The oil will run into the funnels and out through the discharge pipe in a very short time. The surface of the water is skimmed free of oil which collects after coming through the exhaust from the engine.

The boiler feed is located about twelve inches from the bottom of the tank, in order to draw water from the above sediment line. The sediment should be drawn out occasionally through a three-inch opening at the bottom of the tank. This opening is kept closed with a wooden plug.

Prices on heaters described above will be furnished upon application. We are prepared to quote prices on heaters of any size or capacity.

Useful Information

25 cubic feet of sand=1 ton.

18 cubic feet of earth=1 ton.

17 cubic feet of clay=1 ton.

13 cubic feet of quartz, unbroken in lode=1 ton.

18 cubic feet of gravel or earth, before digging=27 cubic feet when dug

20 cubic feet of quartz broken (of ordinary fineness coming from the lode)=1 ton contract measurement.

A horse-power is equivalent to raising 33,000 lbs. 1 foot per minute, or 550 lbs. 1 foot per second.

For sluicing tailings out of leaching tanks it requires approximately 100 gallons of water per ton of tailings.

The consumption of cyanide is approximately from ½ lb. to 1 lb. per ton of ore treated.

The consumption of zinc in precipitation boxes is from ¼ lb. to ½ lb. per ton of ore treated.

To find circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle, multiply circumference by .31831.

To find area of a circle, multiply square of diameter by .7854.

To find capacity of tanks in cubic feet: Square diameter of bottom in feet; multiply the square of the mean diameter by the depth (all in feet), and this product by 5⅞; the result will be in gallons, absolutely correct.

Height of tank being known, to find diameter of tank needed for any capacity: Divide quantity desired by .0034, divide remainder by height in inches and obtain square root. The value thus obtained is the diameter in inches; divide by 12 to obtain diameter in feet.

To find weight of water in tank: Multiply capacity of gallons by 8.34.

A cubic foot of water contains 7½ gallons and weighs 62½ lbs.

A miner's inch of water is equal to nine gallons per minute.

A cubic foot per second is equal to 50 miner's inches, or 450 gallons per minute.

A gallon of fresh water weighs 8.34 lbs., and contains 231 cubic inches.

A cubic foot of fresh water weighs 62.5 lbs. and contains 1728 cubic inches or 7.5 gallons.

Doubling the diameter of pipe increases its capacity four times.

Theoretically water can be raised by suction 33 feet, but practically only 25 to 28 feet.

27,154 gallons of water will cover one acre one inch deep.

225 gallons per minute, or 25 miner's inches, will be sufficient to cover one acre one inch deep in two hours and one minute.

Tanks furnished from our Puget Sound Factory are manufactured from Washington Fir. Our San Francisco and Los Angeles Factories make a specialty of Redwood Tanks, but are prepared to furnish Fir Tanks when requested.

Reference Tables and Information

Cyanides

Cyanide of Potassium—KCN or KCy.

Cyanide of Sodium—NaCN or NaCY.

Cyanogen is composed of Carbon and Nitrogen, both together forming a composition for which the chemical formula "Cy" is used, and which in its action is similar to one single element.

Cyan(ogen)ide of Potassium and Cyan(ogen)ide of Sodium are combinations of Cyanogen, with the basis Potassium and Sodium, respectively, the latter only acting as carriers for the Cyanogen.

The action of the Cyanides in the extraction of gold and silver from their ores is based on the fact that they form with these precious metals soluble double compounds.

TESTING CYANIDE

The standard test in use is the so-called Nitrate of Silver test. This test is based on the fact that Cyanides form with Nitrate of Silver, when both are in solution, precipitates. In practice, a given quantity of Cyanide to be tested is dissolved in distilled water and titrated with one-tenth normal solution of Nitrate of Silver. As the curdy white precipitate, Cyanide of Silver, readily dissolves, as long as there is a surplus of Cyanide in the solution present, sufficient Nitrate of Silver solution is added until a permanent milky appearance is obtained. The addition of a small quantity of Chloride of Sodium or Iodide of Potassium will help to give a more distinct reaction to the eye. Each cubic centimeter normal solution of Nitrate of Silver is equal to 0.013 grams pure Cyanide, so the exact strength of the Cyanide is easily ascertained. It is obvious that the strength of the Nitrate of Silver solution may be so adjusted as to save all further calculation. This formula is also useful for estimating the strength of Cyanide solution.

Although Cyanide is poisonous, it can be safely handled, only care must be taken that it does not come in contact with sores and is not taken internally.

ANTIDOTES FOR CYANIDE POISONING

All Cyanides are deadly poisons, but the aqueous solutions used in practice are so dilute that there is little or no danger from the prussic acid evolved from them if the buildings are properly ventilated.

Acids react on Cyanides, liberating Prussic Acid gas, which causes almost instant death when inhaled in a pure state. When diluted with air, it causes faintness, dizziness and a depressing frontal headache.

Even very dilute solutions of Cyanide are poisonous when taken internally, and, when they come in contact with the skin, produce in some persons an eruption of painful red boils. In cases where the hands and arms must be brought into contact with the solutions, rubber gloves, reaching over the elbows, should be provided for the workmen. Kaffir workmen are said to suffer no inconvenience whatsoever from the contact of their skin with Cyanide solutions.

Considering the extensive use of Cyanide, the number of fatal accidents is remarkably small. Up to the present time only one fatal case has been recorded in New Zealand.

In case of accident from Cyanide poisoning, the following remedies are recommended: Put the patient into a hot bath, and apply cold water to his back and neck. In cases of internal poisoning, vomiting should be induced by emetics or by physical means.

Freshly precipitated carbonate of iron, obtained by mixing equal quantities of Sodium Carbonate and Ferrous Sulphate, is recommended for internal use.

If the poisoning is the result of inhaling Prussic Acid gas, it is advisable to make the patient inhale a small quantity of chlorine gas, ammonia or ether. The chlorine gas can be quickly made and applied by sprinkling a little bleaching powder on a piece of flannel moistened with Acetic Acid, and then holding the flannel to the nostrils of the patient.

Reference Tables and Information—Continued

PROSPECTOR'S GOLD TABLE

For Determining the Value of Free Gold Per Ton (2000 lbs.) of Quartz or Cubic Yard of Gravel

The table below furnishes an exceedingly simple method for determining the value of [illegible] ton of gold-bearing quartz, or a cubic yard of auriferous gravel.

Take a sample of four (4) pounds of quartz, pulverize it to the usual fineness for [illegible] carefully by batea, pan or other means; amalgamate the gold by the [illegible] quicksilver; volatilize the quicksilver by blow-pipe or otherwise; weigh [illegible] button, and the value given in the table opposite such weight will be the [illegible] gold per ton of 2000 lbs. of quartz.

Example.—Sample of four lbs. produces button weighing one grain, the fineness of the gold being 830; then the value of one ton of such quartz will be $17.87.

If the sample of four lbs. should produce a button weighing, say, four-tenths (.4) of a grain, then the value of such quartz would be (830 fine) $7.14 per ton.

Weight Washed Gold, 4-lb. Sample, Grains	Fineness, 780. Value per oz., $16.12	Fineness, 830. Value per oz., $17.15	Fineness, 875. Value per oz., $18.08	Fineness, 920. Value per oz., $19.01
1	$ 1.68	$ 1.78	$ 1.88	$ 1.98
2	3.36	3.57	3.76	3.96
3	5.03	5.36	5.65	5.94
4	6.71	7.14	7.53	7.92
5	8.40	8.93	9.42	9.90
6	10.07	10.73	11.30	11.88
7	11.75	12.51	13.19	13.86
8	13.43	14.29	15.07	15.84
9	15.11	16.08	16.95	17.82
10	16.79	17.87	18.84	19.81
20	33.59	35.74	37.68	39.62
30	50.38	53.61	56.52	59.43
40	67.18	71.49	75.36	79.24
50	83.97	89.36	94.20	99.05

GOLD VALUE OF A CUBIC YARD OF GRAVEL

To determine the gold value of a cubic yard of auriferous gravel, the same table can also be used.

Take a sample of sixty (60) pounds of gravel, pulverize it, and carefully wash it by batea, pan or otherwise; amalgamate the gold, volatilize the quicksilver; weigh the button, and in column in table, opposite weight, will be found the gold value of the cubic yard of gravel.

Example.—Sample of sixty lbs. produces button weighing one grain the fineness of the gold being 780; then the value of one cubic yard of such gravel would be $1.68. This is arrived at by pointing off one point, or dividing the value given in the table by 10.

If the sample of sixty lbs. yields a button weighing five-tenths (.5) of a grain, then the value of the gravel would be—gold being 780 fine— $0.84 per cubic yard.

SIMPLE ORE TESTS

The following simple tests will show whether an ore carries any precious metal. Afterwards samples of the rock should be assayed to ascertain the amount of value per ton.

Gold.—Powder; roast if sulphurets are present; grind very fine and wash in pan or spoon; examine with lens; yellow particles not soluble in nitric acid. The color of pure gold is bright yellow, tinged with red. Gold may be distinguished from all other metals or alloys by the following simple traits: It is yellow, malleable, not acted upon by nitric acid.

Silver. Pure silver is the brightest of metals, of a beautiful white color and rich luster.

Chloride of Silver.—If suspected in a pulp, harshly rub a bright and wet copper cartridge thereon. If a chloride or chloride-bromide of silver, it will whiten the copper. Graphite will thus whiten copper or gold, but can be rubbed off.

Copper.—After roasting the pulp, intimately mix and well knead with a like quantity of salt and candle grease or any other fat, and cast into the fire, when the characteristic colors—first blue, then green will appear. This test is better made at night.

Galena.—Black zinc blende is often mistaken for galena. The two may be distinguished by the infallible sign: The powder of galena is black; that of blende, brown or yellow.

How to Determine Purity of Potassium Cyanide

Take a sample of the KCN to be tested across the thickness of the cake. Reduce this sample by crushing to a fine powder. To one gram of this reduced sample add 100 c.c. of distilled water. Take 10 c.c. of this solution and titrate it with standard Silver Nitrate. The number of c.c. of Silver Nitrate required to produce a permanent precipitate multiplied by five will give the percentage of KCN contained in sample.

The above is not a determination of actual Cyanogen present, but a simple test to give working value of Cyanide.

STRENGTH OF KCN SOLUTION

To 1000 c.c. of distilled water add 6.535 grains of c.p. Silver Nitrate and standardize with a known strength of Cyanide solution.

For determining the amount of Cyanide in solution, take 10 c.c. of the solution (measured in a pipette) and place it in a small beaker; titrate this with the Silver Nitrate solution, until an opalescent precipitate appears. The number of c.c. of Silver Nitrate used in tritration will then equal the number of pounds of Cyanide in one ton of the solution.

ACIDITY TEST

Place fifty grams of pulp in a bottle suitable for agitating; add 25 c.c. of a decinormal (N/10) caustic soda solution (as described further on) and 75 c.c. of water; agitate for an hour and filter off the solution. Titrate 20 c.c. of this filtrate with a decinormal (N/10) solution of Sulphuric Acid, using as an indicator Phenolphthalien or Methyl-Orange.

Five minus the Burette reading, multiplied by 2, will give the number of pounds of lime necessary to add to each ton of ore to keep the Cyanide solution at the proper point of alkalinity.

In connection with the above, lime is presumed to be 65° pure.

It is advisable before making above acid test to agitate fifty grains of ore with 100 c.c. of water, filter and try the filtrate with litmus paper. If this shows a strong reaction, there is a quantity of free acid present, which may be removed by a water wash.

PREPARATION OF N/10 SULPHURIC ACID SOLUTION

Add 30 c.c. concentrated c.p. Sulphuric Acid to a litre of distilled water; make determination of Sulphuric Acid and correct until solution is absolutely normal; each c.c. of this solution then contains .049 grains of H_2SO_4; add 100 c.c. of this solution to 900 c.c. of distilled water, and we have the N/10 solution, each c.c. of which contains .0049 Sulphuric Acid.

PREPARATION OF N/10 SODIUM HYDRATE SOLUTION

Dissolve about 56 grains of pure Caustic Soda in 1000 c.c. of distilled water (this will give a solution slightly stronger than normal). Titrate this with the normal Sulphuric Acid solution, using Litmus or Phenophthalien for an indicator; make corrections and titrate again until one c.c. of this solution is equivalent to one c.c. of Sulphuric Acid. Add to 100 c.c. of this solution 900 c.c. of distilled water and one c.c. of this N/10 solution will neutralize one c.c. of N/10 Sulphuric Acid solution.

DETERMINATION OF SULPHUR IN H_2SO_4

Place in weighed platinum dish two grains, approximately, of recently heated Sodium Carbonate. Dissolve with a small amount of distilled water, cover and carefully add 25 c.c. of Sulphuric Acid to be tested.

Evaporate to dryness on water bath. Remove cover and dry at 180° in air bath to constant weight.

In this process $SO_4=96$ has displaced $CO_3=:60$; the difference in weight of platinum dish and contents before and after adding Sulphuric Acid is proportionate to amount of H_2SO_4 in the 25 c.c. Then (96—60) : 98 :: difference in weight : x (H_2SO_4 in 25 c.c.). $x \div 25 = .049$.

DETERMINATION OF OTHER CONTENTS OF ORE WHICH WILL DECOMPOSE KCN

1 [illegible] grams of the ore in a pint fruit jar and add 1000 c.c. of 10 pounds solution, [illegible] it be stood for 12 or 24 hours, and then drain slowly. Titrate the drained [illegible] to determine Cyanide content, and note loss in strength.

Make a similar test with a sample to which lime has been added, as determined by [illegible]. The difference between the two tests, which will represent the loss due to [illegible] of the decomposing contents of the ore than the acid.

If the ore is heavy, a determination must be made to ascertain the cause

TO DETERMINE ALKALINITY OF CYANIDE SOLUTION

Take 10 c.c. of solution in a small beaker, and titrate it with Silver Nitrate for Cyanide. Add as much more Silver Nitrate as used in the titration, then add an excess of [illegible] Ferro Cyanide; add a drop or two of Phenophthalien and titrate with Nitric Acid solution.

If the solution contains much zinc, it will be necessary to filter before titrating.

The Burette reading multiplied by .0112 will give the percentage of protective alkalinity of the Cyanide solution, which should be about 2%.

TROY WEIGHTS

24 grains = 1 pwt.
480 grains = 20 pwt. = 1 oz.
5760 grains = 240 pwt. = 12 oz. = 1 lb. = 22.816 cu. in. of distilled water at 62° Fahr.

1 Troy Ounce Pure Gold	=	$20.6718
1 Gram Pure Gold	=	0.6646
1 Troy Ounce contains		31.10348 grams
1 Avoirdupois Ounce contains		28.3475 grams
1 Avoirdupois Pound contains		453.5924277 grams
1 Ton Water	=	Appr. 240.3 gallons
Recent practice also		32⅛ cu. ft.

ASSAY TON WEIGHTS

1 Pound Avoirdupois	= 7000 Troy Grains
2000 Pounds	= 1 Ton
2000 x 7000	= 14,000,000 Troy Grains
480 Troy Grains	= 1 oz. Troy
14,000,000 ÷ 480	= 29,166 Troy Ounces
29,166 Milligrammes	= 1 Assay Ton

2000 pounds : 1 Assay Ton :: 1 oz. Troy : 1 Milligramme.

TABLE OF HEATING DEGREES

	C.	F.		C.	F.
Red	525°	955°	Yellow	1100°	2012°
Dark Red	700°	1292°	White	1300°	2372°
Cherry Red	850°	1562°	Full White	1500°	2732°
Light Red	900°	1652°			

ATOMIC WEIGHTS

Metals	Symbol	Atomic Weight	Metals	Symbol	Atomic Weight
Aluminum	Al.	27.4	Manganese	Mn.	55.0
Antimony	Sb.	122.0	Mercury	Hg.	200.0
Arsenic	As.	75.0	Molybdenum	Mo.	96.0
Barium	Ba.	137.0	Nickel	Ni.	58.0
Bismuth	Bi.	210.0	Nitrogen	N.	14.0
Boron	B.	11.0	Oxygen	O.	16.0
Bromine	Br.	80.0	Palladium	Pd.	106.0
Cadmium	Cd.	112.0	Phosphorus	P.	31.0
Caesium	Cs.	133.0	Platinum	Pt.	197.4
Caleium	Ca.	40.0	Potassium	K.	39.1
Carbon	C.	12.0	Rhodium	Ro.	104.0
Cerium	Ce.	91.3	Selenium	Se.	79.0
Chlorine	Cl.	35.5	Silicon	Si.	28.0
Chromium	Cr.	52.2	Silver	Ag.	108.0
Cobalt	Co.	60.0	Sodium	Na.	23.0
Copper	Cu.	63.4	Strontium	Sr.	88.0
Fluorine	F.	19.0	Sulphur	S.	32.0
Gold	Au.	197.0	Tellurium	Te.	128.0
Hydrogen	H.	1.0	Tin	Sn.	118.0
Iodine	I.	127.0	Tungsten	W.	184.0
Iridium	Ir.	198.0	Uranium	U.	120.0
Iron	Fe.	56.0	Vanadium	V.	51.3
Lead	Pb.	207.0	Zinc	Zn.	65.0
Lithium	Li.	7.0	Zirconium	Zr.	89 6
Magnesium	Mg.	24.0			

Amount of Gold and Silver in Cyanide Solution

Alfred Chiddy's Method

Add to four assay tons (or more) of the solution 10 c.c. of 10% solution of lead acetate; then 4 grams zinc shavings; boil a minute; add 20 c.c. HCL (strong). When action has ceased, boil again and decant from the ball of spongy lead, which has been decanted a little with a glass rod, and wash same by decantation. Transfer to a piece of filter paper, roll into a compact ball and place (without drying) on a hot cupel in the muffle.

It is best to transfer the compact ball from the filter paper to a piece of c. p. lead foil and then cupel directly or scorify first, then cupel.

Do not add all of the 20 c. c. HCL at once, as zinc may break up on account of violent action.

Another Method

Take a piece of c. p. lead foil and form a tray about 5" long, 2½" wide and ¾" deep, and evaporate in this tray from one to three assay tons of the solution until dry, and then cupel the lead.

It is seldom necessary to scorify the lead before cupelling, unless the solution is very foul.

TABLES OF KCN SOLUTIONS

1 lb. KCN to 1 ton water	0.05%	solution
2 " " " 1 " "	0.10%	"
3 " " " 1 " "	0.15%	"
4 " " " 1 " "	0.20%	"
5 " " " 1 " "	0.25%	"
6 " " " 1 " "	0.30%	"
7 " " " 1 " "	0.35%	"
8 " " " 1 " "	0.40%	"
9 " " " 1 " "	0.45%	"
10 " " " 1 " "	0.50%	"

.5 grammes KCN added to 1,000 c.c. water	0.05%	solution
1.0 " " " " 1,000 " "	0.10%	"
1.5 " " " " 1,000 " "	0.15%	"
2.0 " " " " 1,000 " "	0.20%	"
2.5 " " " " 1,000 " "	0.25%	"
3.0 " " " " 1,000 " "	0.30%	"
3.5 " " " " 1,000 " "	0.35%	"
4.0 " " " " 1,000 " "	0.40%	"
4.5 " " " " 1,000 " "	0.45%	"
5.0 " " " " 1,000 " "	0.50%	"

U. S. Gallons in Round Tanks

For One Foot in Depth

Tanks	No. U. S Gals.	Cubic Ft. and Area in Sq. Ft.	Dia. of Tanks	No. U. S. Gals.	Cubic Ft. and Area in Sq. Ft.	Dia. of Tanks	No. U. S. Gals.	Cubic Ft. and Area in Sq. Ft.
	87	785	9 ft. 8 in.	188.66	25.22	19 ft.	2120.90	283.53
	6.80	922	9	194.25	25.97	19 3 in.	2177.10	291.04
	8.00	1.069	9 10	199.92	26.73	19 6	2234.00	298.65
	9.18	1.227	9 11	205.67	27.49	19 9	2291.70	306.35
	10.44	1.396	10	211.51	28.27	20	2350.10	314.16
	11.79	1.576	10 3	220.50	30.68	20 3	2409.20	322.06
	13.22	1.767	10 6	248.23	33.18	20 6	2469.10	330.06
	14.73	1.969	10 9	267.69	35.78	20 9	2529.60	338.16
	16.32	2.182	11	287.88	38.48	21	2591.00	346.36
	17.99	2.405	11 3	308.81	41.28	21 3	2653.00	354.66
	19.75	2.640	11 6	330.48	44.18	21 6	2715.80	363.05
	21.58	2.885	11 9	352.88	47.17	21 9	2779.30	371.54
2	23.50	3.142	12	376.01	50.27	22	2843.60	380.13
	25.50	3.409	12 3	399.88	53.46	22 3	2908.60	388.82
	27.58	3.687	12 6	424.48	56.75	22 6	2974.30	397.61
	29.74	3.976	12 9	449.82	60.13	22 9	3040.80	406.49
	31.99	4.276	13	475.89	63.62	23	3108.00	415.48
	34.31	4.587	13 3	502.70	67.20	23 3	3175.90	424.56
6	36.72	4.909	13 6	530.24	70.88	23 6	3244.60	433.74
7	39.21	5.241	13 9	558.51	74.66	23 9	3314.00	443.01
8	41.78	5 585	14	587.52	78.54	24	3384.10	452.39
9	44.43	5.940	14 3	617.26	82.52	24 3	3455.00	461.86
10	47.16	6 305	14 6	640.74	86 59	24 6	3526 60	471.44
11	49.98	6 681	14 9	678.95	90.76	24 9	3598.90	481.11
3	52.88	7 069	15	710.90	95 03	25	3672.00	490.87
1	55 86	7 467	15 3	743.58	99 40	25 3	3745.80	500.74
2	58 92	7 876	15 6	776.99	103.87	25 6	3820.30	510.71
3	62.06	8 296	15 9	811.14	108.43	25 9	3895.60	520.77
4	65 28	8.727	16	846.03	113.10	26	3971.60	530.93
5	68.58	9 168	16 3	881.65	117.86	26 3	4048.40	541.19
6	71 97	9.621	16 6	918.00	122.72	26 6	4125.90	551.55
7	75.44	10 085	16 9	955.09	127.68	26 9	4204.10	562.00
8	78.99	10.559	17	992.91	132.73	27	4283.00	572.66
9	82 62	11.045	17 3	1031.50	137.89	27 3	4362.70	583.21
10	86.33	11.541	17 6	1070.80	143.14	27 6	4443.10	593.96
11	90 13	12 048	17 9	1110.80	148 49	27 9	4524.30	604.81
4	94 00	12.566	18	1151.50	153.94	28	4606.20	615.75
4 1	97 96	13.095	18 3	1193.00	159.48	28 3	4688.80	626.80
4 2	102.00	13 635	18 6	1235.30	165.13	28 6	4772.10	637.94
4 3	106.12	14 186	18 9	1278.20	170.87	28 9	4856.20	649.18
4 4	110.32	14.748	19	1321.90	176.71	29	4941.00	660.52
4 5	114 61	15 321	19 3	1366.40	182.65	29 3	5026.60	671.96
4 6	118.97	15.90	19 6	1411.50	188.69	29 6	5112.90	683.49
4 7	123 42	16 50	19 9	1457.40	194 83	29 9	5199.90	695.13
4 8	127.95	17 10	20	1504.10	201.06	30	5287.70	706.86
4 9	132.56	17 72	20 3	1551.40	207.39	30 3	5376.20	718.69
4 10	137 25	18 35	20 6	1599.50	213.82	30 6	5465.40	730.62
4 11	142 02	18 99	20 9	1648.40	220 35	30 9	5555.40	742.64
5	146 88	19 63	21	1697.90	226.98	31	5646.10	754.77
5 1	151 82	20 29	21 3	1748.20	233.71	31 3	5737.50	766.99
5 2	156 83	20 97	21 6	1799.30	240.53	31 6	5829 70	779.31
5 3	161 93	21 65	21 9	1851.10	247.45	31 9	5922.60	791.73
5 4	167 12	22 34	22	1903.60	254.47	32	6016.20	804.25
5 5	172.38	23 04	22 3	1956.80	261.59	32 3	6110.60	816.86
5 6	177 72	23 76	22 6	2010.80	268.80	32 6	6205.70	829.58
5 7	183 15	24 48	22 9	2065.50	276.12	32 9	6301.50	842.39

31½ Gallons equals 1 Barrel

To find the capacity of tanks greater than the largest given in the table, look in the table for a tank of one-half of the given size, and multiply its capacity by 4, or one of one-third its size, and multiply its capacity by 9, etc.

Circumference and Areas of Circles

Diameter in Inches	Circumference in Inches	Area in Square Inches	Diameter in Inches	Circumference in Inches	Area in Square Inches
1	3.1416	.7854	51	160.222	2042.83
2	6.2832	3.1416	52	163.363	2123.72
3	9.4248	7.0686	53	166.505	2206.19
4	12.5664	12.5664	54	169.646	2290.23
5	15.708	19.635	55	172.788	2375.83
6	18.8496	28.2744	56	175.93	2463.01
7	21.9912	38.4846	57	179.071	2551.76
8	25.1328	50.2656	58	182.213	2642.09
9	28.2744	63.6174	59	185.354	2733.98
10	31.416	78.54	60	188.496	2827.44
11	34.5576	95.0334	61	191.638	2922.47
12	37.6992	113.098	62	194.779	3019.08
13	40.8408	132.733	63	197.921	3117.25
14	43.9824	153.938	64	201.062	3217.00
15	47.124	176.715	65	204.204	3318.31
16	50.2656	201.062	66	207.346	3421.2
17	53.4072	226.981	67	210.487	3525.66
18	56.5488	254.47	68	213.629	3631.69
19	59.6904	283.529	69	216.77	3739.29
20	62.832	314.16	70	219.912	3848.46
21	65.9736	346.361	71	223.054	3959.2
22	69.1152	380.134	72	226.195	4071.51
23	72.2568	415.477	73	229.337	4185.4
24	75.3984	452.39	74	232.478	4300.85
25	78.54	490.875	75	235.62	4417.87
26	81.6816	530.93	76	238.762	4536.47
27	84.8232	572.557	77	241.903	4656.64
28	87.9648	615.754	78	245.045	4778.37
29	91.1064	660.521	79	248.186	4901.68
30	94.248	706.86	80	251.328	5026.56
31	97.3896	754.769	81	254.47	5153.01
32	100.5312	804.25	82	257.611	5281.03
33	103.673	855.301	83	260.753	5410.62
34	106.814	907.922	84	263.894	5541.78
35	109.956	962.115	85	267.036	5674.51
36	113.098	1017.878	86	270.178	5808.82
37	116.239	1075.213	87	273.319	5944.69
38	119.381	1134.118	88	276.461	6082.14
39	122.522	1194.593	89	279.602	6221.15
40	125.664	1256.64	90	282.744	6361.74
41	128.806	1320.26	91	285.886	6503.9
42	131.947	1385.45	92	289.027	6647.63
43	135.089	1452.2	93	292.169	6792.92
44	138.23	1520.53	94	295.31	6939.79
45	141.372	1590.43	95	298.452	7088.23
46	144.514	1661.91	96	301.594	7238.25
47	147.655	1734.95	97	304.735	7389.83
48	150.797	1809.56	98	307.877	7542.98
49	153.938	1885.75	99	311.018	7697.71
50	157.08	1963.5	100	314.16	7854.00

TABLE OF DECIMAL EQUIVALENTS OF PARTS OF ONE INCH

1/64	.015625	17/64	.265625	33/64	.515625	49/64	.765625
1/32	.03125	9/32	.28125	17/32	.53125	25/32	.78125
3/64	.046875	19/64	.296875	35/64	.546875	51/64	.796875
1/16	.0625	5/16	.3125	9/16	.5625	13/16	.8125
5/64	.078125	21/64	.328125	37/64	.578125	53/64	.828125
3/32	.09375	11/32	.34375	19/32	.59375	27/32	.84375
7/64	.109375	23/64	.359375	39/64	.609375	55/64	.859375
1/8	.125	3/8	.375	5/8	.625	7/8	.875
9/64	.140625	25/64	.390625	41/64	.640625	57/64	.890625
5/32	.15625	13/32	.40625	21/32	.65625	29/32	.90625
11/64	.171875	27/64	.421875	43/64	.671875	59/64	.921875
3/16	.1875	7/16	.4375	11/16	.6875	15/16	.9375
13/64	.203125	29/64	.453125	45/64	.703125	61/64	.953125
7/32	.21875	15/32	.46875	23/32	.71875	31/32	.96875
15/64	.234375	31/64	.484375	47/64	.734375	63/64	.984375
1/4	.25	1/2	.50	3/4	.75	1	1.00

Weights of Square and Round Steel Bars

Per lineal foot — One cubic foot of steel weighing 489.6 lbs.

Size in Inches	Square, Wt. in Lbs.	Round, Wt. in Lbs.	Size in Inches	Square, Wt. in Lbs.	Round, Wt. in Lbs.
	.013	.010	4 1/8	57.85	45.44
	.053	.042	4 1/4	61.41	48.24
	.119	.094	4 3/8	65.08	51.11
	.212	.167	4 1/2	68.85	54.07
	.333	.261	4 5/8	72.73	57.12
	.478	.375	4 3/4	76.71	60.25
	.651	.511	4 7/8	80.81	63.46
	.850	.667	5	85.00	66.76
	1.076	.845	5 1/8	89.30	70.14
	1.328	1.043	5 1/4	93.72	73.60
	1.608	1.262	5 3/8	98.23	77.15
	1.913	1.502	5 1/2	102.80	80.77
	2.245	1.763	5 5/8	107.6	84.49
	2.603	2.044	5 3/4	112.4	88.29
	2.989	2.347	5 7/8	117.4	92.17
1	3.400	2.670	6	122.4	96.14
1 1/8	4.303	3.379	6 1/4	127.6	100.2
1 1/4	5.312	4.173	6 1/2	132.8	104.3
1 3/8	6.428	5.049	6 3/4	138.2	108.5
1 1/2	7.650	6.008	6 7/8	143.6	112.8
1 5/8	8.978	7.051	6 5/8	149.2	117.2
1 3/4	10.41	8.178	6 3/4	154.9	121.7
1 7/8	11.95	9.388	6 7/8	160.8	126.2
2	13.60	10.68	7	166.6	130.9
2 1/8	15.35	12.06	7 1/4	172.6	135.6
2 1/4	17.22	13.52	7 1/4	178.7	140.4
2 3/8	19.18	15.07	7 3/8	184.9	145.3
2 1/2	21.25	16.69	7 1/2	191.3	150.2
2 5/8	23.43	18.40	7 5/8	197.7	155.2
2 3/4	25.71	20.20	7 3/4	204.2	160.3
2 7/8	28.10	22.07	7 7/8	210.8	165.6
3	30.60	24.03	8	217.6	171.0
3 1/8	33.20	26.08	8 1/8	224.5	176.3
3 1/4	35.92	28.20	8 1/4	231.4	181.8
3 3/8	38.73	30.42	8 3/8	238.5	187.3
3 1/2	41.65	32.71	8 1/2	245.6	193.0
3 5/8	44.68	35.09	8 5/8	252.9	198.7
3 3/4	47.82	37.56	8 3/4	260.3	204.4
3 7/8	51.05	40.10	8 7/8	267.9	210.3
4	54.40	42.73	9	275.4	216.3

Weights of Flat Rolled Steel

Per lineal foot — One cubic foot weighing 489.6 lbs.

Width in Inches	Thickness in Inches														
	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
1	.64	.85	1.06	1.28	1.49	1.70	1.92	2.12	2.34	2.55	2.76	2.98	3.19	3.40	
1 1/4	.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.19	3.45	3.72	3.99	4.25	
1 1/2	.957	1.28	1.59	1.92	2.23	2.55	2.87	3.19	3.51	3.83	4.14	4.47	4.78	5.10	
1 3/4	1.11	1.49	1.86	2.23	2.60	2.98	3.35	3.72	4.09	4.47	4.84	5.20	5.58	5.95	
2	1.28	1.70	2.12	2.55	2.98	3.40	3.83	4.25	4.67	5.10	5.53	5.95	6.38	6.80	
2 1/4	1.44	1.91	2.39	2.87	3.35	3.83	4.30	4.78	5.26	5.75	6.21	6.69	7.18	7.65	
2 1/2	1.59	2.12	2.65	3.19	3.72	4.25	4.78	5.31	5.84	6.38	6.90	7.44	7.97	8.50	
2 3/4	1.75	2.34	2.92	3.51	4.09	4.67	5.26	5.84	6.43	7.02	7.60	8.18	8.77	9.35	
3	1.91	2.55	3.19	3.83	4.46	5.10	5.74	6.38	7.02	7.65	8.29	8.93	9.57	10.20	
3 1/4	2.07	2.76	3.45	4.15	4.83	5.53	6.22	6.91	7.60	8.29	8.98	9.67	10.36	11.05	
3 1/2	2.23	2.98	3.72	4.47	5.20	5.95	6.70	7.44	8.18	8.93	9.67	10.41	11.16	11.90	
3 3/4	2.39	3.19	3.99	4.78	5.58	6.38	7.17	7.97	8.76	9.57	10.36	11.16	11.95	12.75	
4	2.55	3.40	4.25	5.10	5.95	6.80	7.65	8.50	9.35	10.20	11.05	11.90	12.75	13.60	
4 1/2	2.71	3.61	4.52	5.42	6.32	7.22	8.13	9.03	9.93	10.84	11.74	12.65	13.55	14.45	
4 1/2	2.87	3.83	4.78	5.74	6.70	7.65	8.61	9.57	10.52	11.48	12.43	13.39	14.34	15.30	
4 3/4	3.03	4.04	5.05	6.06	7.07	8.08	9.09	10.10	11.11	12.12	13.12	14.13	15.14	16.15	
5	3.19	4.25	5.31	6.38	7.44	8.50	9.57	10.63	11.69	12.75	13.81	14.87	15.94	17.00	
5 1/4	3.35	4.46	5.58	6.69	7.81	8.93	10.04	11.16	12.27	13.39	14.50	15.62	16.74	17.85	
5 1/2	3.51	4.67	5.84	7.02	8.18	9.35	10.52	11.69	12.85	14.03	15.19	16.36	17.53	18.70	
5 3/4	3.67	4.89	6.11	7.34	8.56	9.77	11.00	12.22	13.44	14.67	15.88	17.10	18.33	19.55	
6	3.83	5.10	6.38	7.65	8.93	10.20	11.48	12.75	14.03	15.30	16.58	17.85	19.13	20.40	
7	4.46	5.95	7.44	8.93	10.41	11.90	13.39	14.87	16.36	17.85	19.34	20.83	22.32	23.80	
8	5.10	6.80	8.50	10.20	11.90	13.60	15.30	17.00	18.70	20.40	22.10	23.80	25.50	27.20	

Telegraph Code

CODE NAME		Outside	Diameter
Oriona	1′	"	"
Orletn	1½′	"	"
Orlopf	2′	"	"
Ornamp	2½′	"	"
Ornith	3′	"	"
Orogra	3½′	"	"
Orotun	4′	"	"
Orphal	4½′	"	"
Orpinf	5′	"	"
Orercy	5½′	"	"
Orthit	6′	"	"
Ortolo	6½′	"	"
Ortyxn	7′	"	"
Orvaln	7½′	"	"
Oryzan	8′	"	"
Oscila	8½′	"	"
Osiern	9′	"	"
Osmazo	9½′	"	"
Osmium	10′	"	"
Ospreg	10½′	"	"
Ostent	11′	"	"
Ostrac	11½′	"	"
Otherg	12′	"	"
Otiose	12½′	"	"
Otomap	13′	"	"
Oublie	13½′	"	"
Ouchnt	14′	"	"
Ouphen	14½′	"	"
Ourset	15′	"	"
Ousten	15½′	"	"
Outarg	16′	"	"
Outbow	16½′	"	"
Outbui	17′	"	"
Ouzelt	17½′	"	"
Ovalif	18′	"	"
Ovalbu	18½′	"	"
Ovatoc	19′	"	"
Overtf	19½′	"	"
Overlo	20′	"	"
Ovulit	20½′	"	"
Owchen	21′	"	"
Owenit	21½′	"	"

CODE NAME		Outside	Diameter
Oyster	22′	"	"
Ozonat	22½′	"	"
Pabula	23′	"	"
Pacate	23½′	"	"
Pacern	24′	"	"
Pachyc	24½′	"	"
Packet	25′	"	"
Packwa	25½′	"	"
Padowp	26′	"	"
Pagack	26½′	"	"
Pagelo	27′	"	"
Pagean	27½′	"	"
Paging	28′	"	"
Paideu	28½′	"	"
Pailbr	29′	"	"
Painab	29½′	"	"
Pairer	30′	"	"
Paisel	30½′	"	"
Pakfon	31′	"	"
Palaci	31½′	"	"
Palank	32′	"	"
Palati	32½′	"	"
Paleog	33′	"	"
Palmic	33½′	"	"
Palmev	34′	"	"
Palpab	34½′	"	"
Panaba	35′	"	"
Pandeo	35½′	"	"
Panhel	36′	"	"
Panopt	36½′	"	"
Pansop	37′	"	"
Panste	37½′	"	"
Papyou	38′	"	"
Paquel	38½′	"	"
Parabl	39′	"	"
Paradl	39½′	"	"
Parale	40′	"	"
Parame	45′	"	"
Paramo	50′	"	"
Parany	60′	"	"
Parsol	70′	"	"

Owletn	Staves	1′	long
Owliut	"	1½′	"
Oxaliz	"	2′	"
Oxamid	"	2½′	"
Oxbown	"	3′	"
Oxgoad	"	3½′	"
Oxheal	"	4′	"
Oxidan	"	4½′	"
Oxipno	"	5′	"
Oxycra	"	6′	"

Parchl	Staves	7′	long
Parial	"	8′	"
Parnig	"	9′	"
Parito	"	10′	"
Parque	"	12′	"
Paroty	"	14′	"
Parsni	"	16′	"
Partak	"	18′	"
Parthe	"	20′	"

Oxycho ... Staves made of 1½" Redwood
Oxymel ... " " " 2" "
Oxymur ... " " " 3" "
Oxyopy ... " " " 4" "

Partic..Staves made of 2" Washington Fir
Partle.. " " " 3" " "
Partri.. " " " 4" " "

Oxyria..Staves made straight without taper.

Parvin..Staves made with patent channel in top.

Oyletn..Staves made with regular taper.

Pasham..Staves made with groove in edge.

NOTE—Use our private code (see pages 116-117-118) and code names after each article listed, when possible, as it will save cost, time and avoid possible errors.

Telegraph Code—Continued

CODE NAME		CODE NAME	
[illegible]	S[illegible] with 2" chime.	Reawak	Staves made with 4" chime.
[illegible]	" 3" "	Rebabt	" " " 5" "
[illegible]	" 3½" "	Rebel	" " " 6" "

[illegible]	B[illegible] to be constructed of	1½"	Redwood.
[illegible]	" " " "	2"	"
[illegible]	" " " "	3"	"
[illegible]	" " " "	4"	"
[illegible]	" " " "	2"	Washington Fir.
[illegible]	" " " "	3"	" "
[illegible]	" " " "	4"	" "
Rebuse	Tank to be constructed of	2"	Redwood.
[illegible]	" " " "	3"	"
[illegible]	" " " "	4"	"
[illegible]	" " " "	2"	Washington Fir.
[illegible]	" " " "	3"	" "
[illegible]	" " " "	4"	" "

Recut ..... Use Band Steel Hoop for each foot in height.

Racket	1½" x ⅜"	Hoop	Reblot	5" x 1/16"	Hoop
Rakel	1¾" x ⅜"	"	Rebuce	6" x 1/16"	"
Ramet	2" x ⅜"	"	Rebcuy	2" x ¼"	"
Rampal	2½" x ⅜"	"	Rebusl	2½" x ¼"	"
Ramso	3" x ⅜"	"	Recade	3" x ¼"	"
Rampl	3½" x ⅜"	"	Recapi	4" x ¼"	"
Ramulo	4" x ⅜"	"	Recita	5" x ¼"	"
Ranch	2" x ½"	"	Reclin	6" x ¼"	"
Ranche	2½" x 1/16"	"	Recogn	3" x 3/8"	"
Rankle	3" x 1/16"	"	Recolf	4" x 3/8"	"
Ransne	3½" x 1/16"	"	Recour	5" x 3/8"	"
Ranup	4" x 1/16"	"	Recrea	6" x 3/8"	"
Ranune	4½" x 1/16"	"			

Rapac ..... Hoops made of ½" round steel.
Rapewt ..... " " " 5/8" " "
Raphew ..... " " " ¾" " "
Raport ..... " " " 7/8" " "
Rareln ..... " " " 1" " "
Rasure ..... All hoops fitted with screw lugs.
Ratabl ..... No hoops wanted.
Rateab ..... Specify hoops to be used.
Rathri ..... Use all riveted hoops.

COST

Ratioc	Goods will cost f. o. b. San Francisco, California	Dollars.
Ratlem	" " " " Olympia, Washington	Dollars.
Ravelt	" " " " Los Angeles, California	Dollars.
Ravish	" " " " your nearest R. R. Station	Dollars.
Rawhen	" " " freight prepaid	Dollars.
Rayahn	Cost, insurance, freight exclusive of import duties.	

DELIVERY

Razelt ..... How soon can you ship?
Reachn ..... When will you ship?
Reactf ..... Can you ship immediately?
Readel ..... Ship as soon as possible.
Realis ..... Ship via.....
Reanim ..... Send tracer after.....
Rearlt ..... Telegraph very quickest possible delivery of
Reasop ..... Name the lowest car-load rate you can get to
Reaven ..... Ship in car-load with.....

Telegraph Code—Concluded

CODE NAME	
Recrim	Can ship within six days from receipt of order.
Reetif	" " " ten " " " " "
Reculf	" " " two weeks " " " "
Recupa	" " " four " " " "
Redanf	" " " two months " " " "
Redint	" commence delivery within six days.
Redubt	" " " " ten "
Sabaen	" ship first car within ten days, balance one car per week.

PACKING

Sabcla	Pack for export with gross and net weight of each package.
Sabulo	Pack for wagon haul.
Sachar	Pack for mule-back transportation.
Sachel	Shall we pack for export transportation?
Sackbu	Shall we pack for mule-back transportation?
Sadano	Goods are packed ready for shipment.
Safegu	Packing instructions will follow.

QUOTATION

Saflow	Quotation satisfactory, ship as soon as possible.
Sagaci	Price can be reduced if specifications are revised.
Sagumu	If quotation is satisfactory, wire at our expense.
Saikyo	Quote price including freight.
Salque	Quote price f. o. b. factory.
Saloan	Quote price for services of tankmen.
Salmes	Quote price, shipping weight and time of delivery on.
Saloge	Quote best price on.
Saltar	We have only quoted regular prices.
Salmin	These prices are subject to a discount of. per cent.
Salrke	These prices are subject to our regular discount.
Salvab	These prices are net cost to you.
Salvon	We are unable to modify our quotation.
Samian	To enable you to secure order, will make following special price.
Sampon	We will make you the following special terms.
Samphi	We have arranged for payment upon presentation of bills lading in.

SHIPMENT

Sanben	Ship by freight: Collect by sight draft.
Sandar	Ship by steamer.
Sandem	Ship by express.
Sandix	Ship as minimum car-load.
Sangui	Ship less than car-load.
Sansce	Ship in car-load with.
Sapadi	We will ship no later than.
Saporn	Your order was shipped on.
Sapote	We expect to ship in.
Saphic	We will ship immediately.
Saprol	Forward shipping directions for.
Sarcob	Weight will be about. pounds.
Sardan	We are ready to ship.
Sargas	They will not be ready to ship until.
Sarigu	Our shipment is less than car-load. Have you anything to fill car?

MISCELLANEOUS

Sarkin	What is the nearest size in stock?
Sashon	Name the lowest rate you can get by car-load to.
Sasfra	Order depends upon prompt delivery.
Sastro	We are figuring with.
Satiat	We have sent tracer after.
Satisf	Nothing of approximate size in stock.
Sative	Will send particulars by mail.
Satyri	Please refer to our letter dated.
Saueyx	Please refer to our telegram dated.
Sauerk	See our descriptive circular for desired information.
Sauroi	For desired information see our catalog No. 7, page.
Savaco	Mail particulars regarding.
Savoyn	We do not understand what you mean by.
Sawart	Have not yet received formal order for.
Sawfly	Shall we go ahead with your order?

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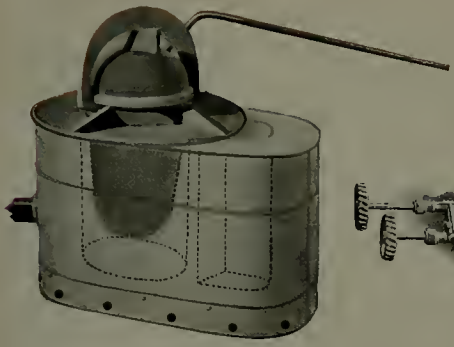
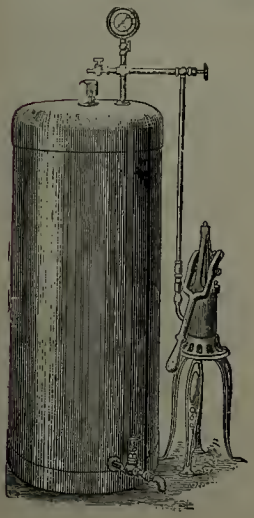
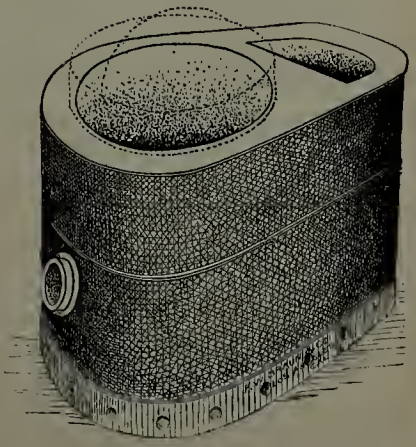
METALLURGICAL LABORATORY APPLIANCES

Complete outfits for refining Cyanide Precipitates







Large stock of Assay Apparatus and Supplies, Cyanide, Mercury, Zinc, Acids and Mining Candles carried in both cities.

DID YOU EVER LOOK INTO WOOD PIPE

Made from California Redwood or Washington Douglas Fir

View from the inside of a 7-foot Continuous Stave Pipe, showing "the men behind the pipe"

CONTINUOUS STAVE PIPE, in sizes from 10 in. to 10 ft. diameter; material shipped knocked down to nearest railroad station.

MACHINE BANDED PIPE, in sizes from 2" to 24" diameter. Shipped made up in random lengths 8 feet upward, ready to lay in place.

FOR PRESSURES up to 400 feet or 173 pounds per square inch.

FOR

CITY WATER WORKS IRRIGATION SYSTEMS
MINING AND POWER PLANTS HYDRAULIC MINING
SEWERS AND ELECTRIC CONDUITS DREDGING
STEAM PIPE CASING

Wood Pipe

ATTENTION

We solicit your inquiries and will submit to you prices or estimates if you will give us the following

(1) The size and kind of pipe you desire
(2) The length of pipe line
(3) The maximum head or pressure.
(4) The amount of water to be delivered.
(5) If it is a gravity or pumping system.
(6) If possible, send plans and profile of system.

This information is necessary in making our estimates, and in quoting prices

REASONS FOR USING WOOD PIPE

(1) It is preserved by water and not rusted or corroded by it.
(2) It is not corroded by sulphur or mineral water and fumes.
(3) It is not destroyed by acids or salts.
(4) Its carrying capacity is 20% greater than cast-iron pipe, and remains constant while metal pipe decreases with age.
(5) It does not taint or effect fluids going through it.
(6) It does not burst when frozen. The elasticity of the wood prevents bursting.
(7) It requires less labor and experience to lay in place than metal pipe.
(8) It can be laid in shallower ditches than metal pipe, for it is not easily affected by frosts.
(9) It is cheaper than steel, wrought-iron or cast-iron pipe.
(10) Its durability exceeds thin steel or wrought-iron pipe, and is classed with cast-iron pipe.

Showing 24-inch Machine Banded Stave Pipe Being Installed for City Water Works and Irrigation

IS USED FOR

CITY WATER WORKS—because
It is durable and costs less than other pressure pipe.
It has greater carrying capacity than other pressure pipe
It delivers the water purer than other pressure pipe.

IRRIGATION SYSTEMS—because
It can be constructed in any place, and of any size or length.
It can be transported and built in place cheaper than any other pressure pipe.
It is not affected by frost like any other pipe.

MINING AND POWER PLANTS—because
It is not corroded by sulphur or mineral waters.
It does not chemically affect fluids passing through it.
It has no inner exposure of metal.

HYDRAULIC MINING AND DREDGING—because
It is easily transported.
It withstands errosion better than metal pipe.
It is easily connected and disconnected.

SEWERS—because
It is the only satisfactory high pressure sewer pipe known.
It is preserved by water.
It resists more chemical and mineral solutions than any other pressure pipe.

STEAM PIPE CASING AND ELECTRICAL CONDUITS—because
It is a non-conductor of heat or cold.
It is easily put in place. It resists electrolysis.

WOOD PIPE

MACHINE BANDED PIPE

For All Purposes

Manufactured in sizes from 2 to 24 inches in diameter, joints 8 ft. upwards in length, and for pressures up to 400 ft. head.

The staves for this pipe are made from clear, well-seasoned, or kiln-dried, redwood or fir. These staves are banded with heavily galvanized steel rod, further protected by being coated with hot asphaltum and tar. The banding is wound on the pipe under a tension that seats it slightly in the wood. The tension of the bands is maintained by means of a clip at the end of each joint, the band passing two or three times through this clip. The spacing and size of the band is determined by the pressure for which the pipe is manufactured. Thus the cost varies, but each class of pipe is made amply strong for the pressure for which it is constructed.

The tenon ends of each joint of pipe are turned to closely fit the collars connecting these joints. Either cast-iron, wood or steel collars are used. In conveying acid or salt waters the wood collar is usually desired.

Fittings of any description are furnished for tapping or connecting wood pipe with any other pipe or for the construction of any kind of a wood pipe system.

For water works, irrigation, mines, sewers, hydraulic dredges, electric conduits and steam pipe casing this pipe cannot be surpassed.

For complete information write to nearest office.

WOOD PIPE

An 8-foot Continuous Stave Pipe Conveying Water for Irrigation and Power

CONTINUOUS STAVE PIPE

This pipe ranges in diameter from 10 inches to 10 feet, and from 100 to 100 miles in one continuous length as desired. It is constructed to stand pressures ranging from 20 to 300 foot head. It is always built continuous and in place, all staves, bands and other material being delivered to the pipe line in knock-down form.

The staves are milled from clear, well-seasoned, or kiln-dried, redwood or fir. The ends of the staves are connected by a tongue which prevents butt-joint leakage. The pipe is banded with individual threaded round steel rods, held in place by malleable or cast-iron shoes.

This pipe is especially fitted for power plants, out-fall sewers and for all water systems where it is desired to deliver a large volume of water. The ease with which it is transported and constructed in the most inaccessible places, linked with its durability, long life and cost, makes the Continuous Stave Pipe the cheapest pressure pipe of large diameter obtainable.

In requesting prices on this class of pipe it is necessary that accurate and complete information be given, as all prices are based upon estimates made up from the information furnished.

For more complete information, catalogs or estimates, address nearest office.

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